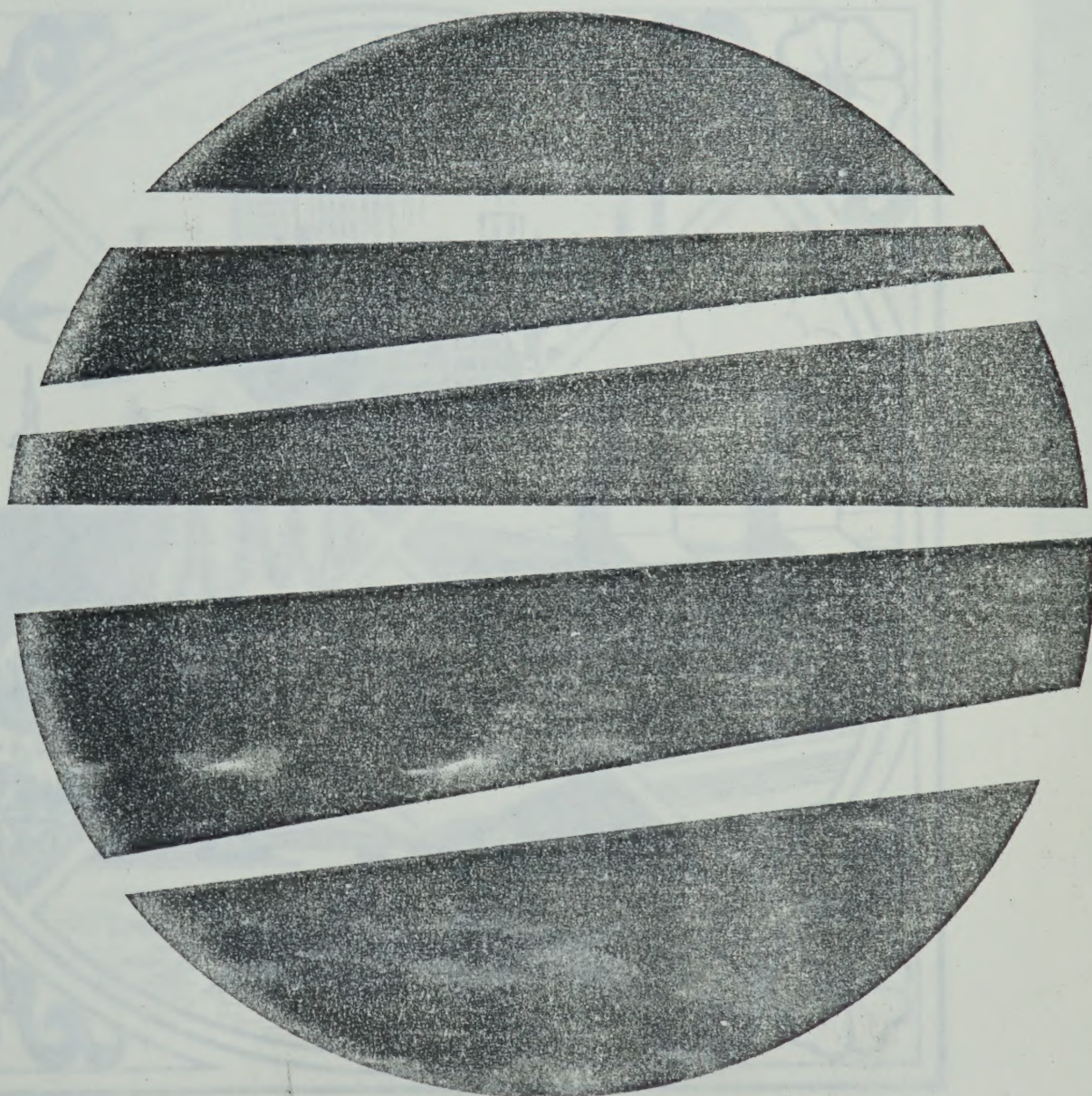
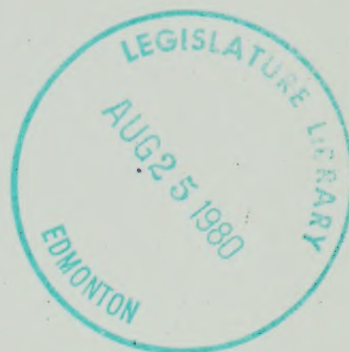
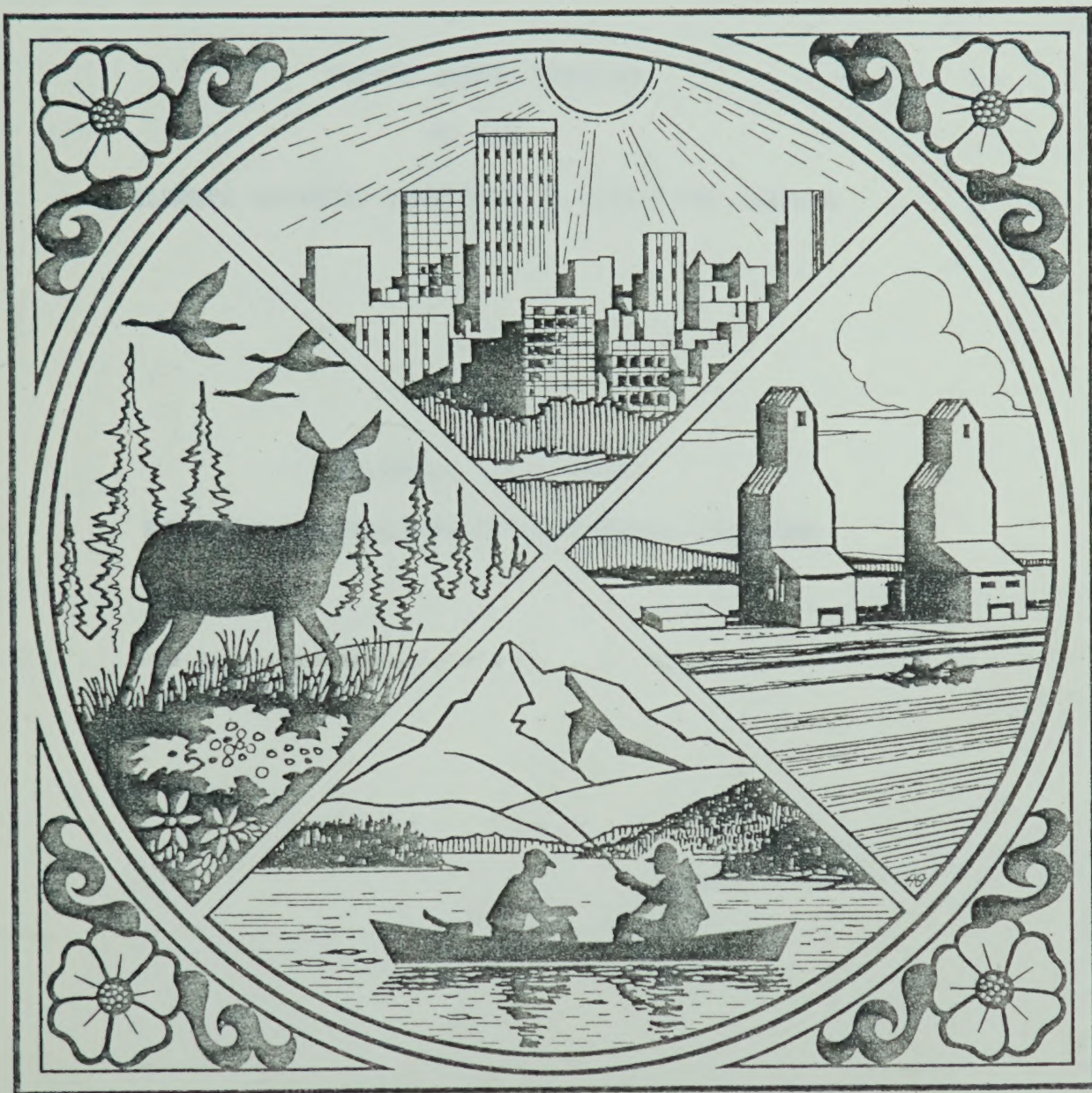


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1970 ADVISORY COMMITTEE ON POLLUTION CONTROL
FOURTH MEETING, NOVEMBER 25 AND 26, 1970, JUBILEE AUDITORIUM - EDMONTON, ALBERTA

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FOURTH ANNUAL MEETING
OF THE
ALBERTA ADVISORY COMMITTEE ON POLLUTION CONTROL

November 25-26, 1970

NORTHERN ALBERTA JUBILEE AUDITORIUM, EDMONTON

E. J. Gage, Director,
Division of Environmental Health

FOREWORD

This publication has been prepared to provide a record of the proceedings of the Fourth Meeting of the Alberta Advisory Committee on Pollution Control. These proceedings are based on the recorded tapes of the meeting and are essentially complete except for miscellaneous or introductory remarks which were not related to the subject. Where written proceedings were made, the written version has been used, otherwise the proceedings are the verbal presentations made during the meeting.

The Fourth Meeting was attended by 78 members of the Advisory Committee and 30 non-members attended as observers.

H. L. Hogge, Director,
Division of Environmental Health.

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ALBERTA ADVISORY COMMITTEE ON POLLUTION CONTROL

FOURTH MEETING - NOVEMBER 25 & 26, 1970

M I N U T E S

The fourth annual meeting of the Alberta Advisory Committee on Pollution Control was held in the Northern Alberta Jubilee Auditorium in Edmonton on Wednesday and Thursday, November 25 and 26, 1970. A list of the persons who registered for this meeting is contained in Appendix A to these minutes. An agenda for the meeting which had been prepared in advance is contained in Appendix B. Some changes in the agenda for the Thursday afternoon sessions were found necessary but otherwise the meeting proceeded in accordance with the prepared agenda.

Opening of the Meeting

The meeting was called to order at 9:00 a.m. on November 25, 1970, by the session chairman, Mr. W. Bannister, a representative of the Canadian Manufacturers' Association (Alberta Division).

Address of the Minister of Health

The chairman introduced the Honourable Mr. J. D. Henderson, Minister of Health and chairman of the Alberta Advisory Committee on Pollution Control. Mr. Henderson's address is attached to these minutes as Appendix C.

Annual Summary, Air Pollution Control Program

Mr. S. L. Dobko, Head, Air Pollution Control Section, Environmental Health Services Division, reported to the Advisory Committee on activities in the field of air pollution control. Mr. Dobko's report is attached to these minutes as Appendix D.

Annual Summary, Water Pollution Control Program

Mr. E. E. Kupchanko, Head, Water Pollution Control Section, Environmental Health Services Division, reported on activities in the field of water pollution control. Mr. Kupchanko's report is attached to these minutes as Appendix E.

Annual Summary, Waterworks and Sewerage Systems

Mr. R. N. Briggs, Head, Municipal Engineering Section, Environmental Health Services Division, reported to the Advisory Committee on the year's activities in the provision and extension of municipal waterworks and sewerage systems. Mr. Briggs report is attached to these minutes as Appendix F.

Following Mr. Briggs' report the meeting recessed briefly for coffee.

Theme Address - Multiple Use of Environment and Resources - Air

Following the recess for coffee the chairman called on Dr. W. L. Faith, Air Pollution Consultant, of San Marino, California, to address the meeting on the subject, Multiple Uses of Environment and Resources. Dr. Faith's address is attached to these minutes as Appendix G.

Theme Address - Multiple Use of Environment and Resources - Water

Mr. F. A. Voegel, Ontario Water Resources Commission, who was present at the meeting as a consultant on water pollution, gave an address on the theme subject, Multiple Use of Environment and Resources. Mr. Voegel's address is attached to these minutes as Appendix H.

Discussion

At the conclusion of Mr. Voegel's address the chairman called for discussion on all of the presentations which had been made during the morning's session. The discussion is reported in Appendix I to these minutes.

Noon Recess

Following this discussion the meeting recessed for lunch which was provided by the Government of Alberta.

Wednesday Afternoon Session, November 25, 1970

Opening

The meeting was called to order following the recess for lunch at 1:00 p.m. The call to order was given by Mr. P. D. Lawson, a representative of the Association of Professional Engineers of Alberta, who chaired the sessions on the afternoon of November 25, 1970. The chairman called for the reports of various Technical Subcommittees.

Technical Subcommittee No. 8 on Air Pollution - Calgary

Dr. L.C. Allan, Chairman, Technical Subcommittee No. 8, Air Pollution, Calgary presented a report on behalf of his subcommittee. This report is attached to these minutes as Appendix J. Following presentation of the report discussion of its contents took place. This discussion is reported in Appendix K to these minutes.

Technical Subcommittee No. 6 on Water Pollution - North Saskatchewan River

Technical Subcommittee No. 6, Water Pollution, North Saskatchewan River, reported. This report was read by Mr. E. E. Kupchanko, Subcommittee Secretary, on behalf of the Subcommittee Chairman, Mr. M.R. Parker, who was unavoidably absent. This report is attached to these minutes as Appendix L. The discussion which followed the report is reported in Appendix M to these minutes.

Technical Subcommittee No. 9 on Air Pollution - Edmonton

Dr. G.H. Ball, Chairman of Technical Subcommittee No. 9, Air Pollution, Edmonton reported for his subcommittee. Dr. Ball's report is attached to these minutes as Appendix N. The discussion on this report is contained in Appendix O to these minutes.

Technical Subcommittee No. 5 on Water Pollution - Bow River

Mr. A. Nicolson, chairman of Technical Subcommittee No. 5, Water Pollution, Bow River reported for his subcommittee. This report is attached

to these minutes as Appendix P. The discussion which followed the presentation of the report is reported in Appendix Q to these minutes.

Technical Subcommittee No. 7 on Water Pollution - Oldman River

As Mr. E. A. Lawrence, Subcommittee Chairman, had been temporarily called from the meeting the report of Technical Subcommittee No. 7, Water Pollution, Oldman River was read on his behalf by Dr. Paul Lewis, a member of the subcommittee. The report presented is attached to these minutes as Appendix R. Mr. Lawrence came into the meeting during the reading of the report which is contained in Appendix S to these minutes.

Technical Subcommittee No. 10 on Air Pollution Control - Sour Gas and Oil Industry

Mr. F. Manyluk, Chairman, Technical Subcommittee No. 10, Air Pollution Control, Sour Gas and Oil Industry, presented a report on behalf of his subcommittee. This report is attached to these minutes as Appendix T. Discussion of the report is contained in Appendix U to these minutes.

Following the discussion of this report the meeting recessed briefly for coffee.

Technical Subcommittee No. 13, Soil Pollution

Following the recess for coffee the meeting received a report from Technical Subcommittee No. 13, Soil Pollution. This report was read by the subcommittee chairman, Mr. A. W. Goettel. The report is contained in Appendix V to these minutes. The discussion on the report is contained in Appendix W to these minutes.

Technical Subcommittee No. 14, Noise

Dr. C. R. May, Chairman, Technical Subcommittee No. 14, Noise, presented a report on behalf of his subcommittee. This report is contained in Appendix X to these minutes. Discussion of the report is contained in Appendix Y to these minutes.

Technical Subcommittee No. 3, Air Quality Criteria

Dr. J. M. Howell, Chairman, Technical Subcommittee No. 3, Air Quality Criteria, presented his subcommittee's report. This report is contained in Appendix Z to these minutes. The discussion of the report is contained in Appendix AA to these minutes.

Technical Subcommittee No. 4, Water Quality Criteria

The report of Technical Subcommittee No. 4, Water Quality Criteria, was read by Dr. W. L. Tollefson on behalf of the subcommittee chairman, Mr. P. D. Lawson. This report is contained in Appendix AB to these minutes. Discussion of the report is contained in Appendix AC to these minutes.

Technical Subcommittee No. 2, Air Pollution Research

The report of Technical Subcommittee No. 2, Air Pollution Research, was read by Mr. W. Bannister on behalf of the subcommittee chairman, Mr. Ben Berto, who was unable to be present. This report is contained in Appendix AD to these minutes. The discussion which took place following the report is contained in Appendix AE to these minutes.

Following the discussion on this report the session chairman, Mr. P. D. Lawson, adjourned the meeting at 5:00 p.m.

Opening of Morning Session, November 26, 1970

The session chairman, Mr. A. Nicolson, City of Calgary, called the meeting to order at 9:00 a.m., Thursday, November 26, 1970. The session chairman indicated that the meeting would continue its consideration of reports of Technical Subcommittees.

Technical Subcommittee No. 1, Water Pollution Research

Professor P. H. Bouthillier, Subcommittee Chairman, presented the report of Technical Subcommittee No. 1, Water Pollution Research. This report is contained in Appendix AF to these minutes. The discussion occasioned by the report is contained in Appendix AG to these minutes.

Technical Subcommittee No. 12, Information and Education

Mr. H. E. Martin, Chairman, Technical Subcommittee No. 12, Information and Education, presented his subcommittee's report. This report is contained in Appendix AH to these minutes. The discussion of the report is contained in Appendix AI to these minutes.

Technical Subcommittee No. 11, Water Pollution Control, Gas and Oil Industry, Drilling and Production

The report of Technical Subcommittee No. 11, Water Pollution Control, Gas and Oil Industry, Drilling and Production, was presented by the subcommittee chairman, Mr. W. L. Grossman. This report is contained in Appendix AJ to these minutes. This report did not provoke any discussion.

Following the presentation of this report the meeting recessed briefly for coffee.

Report on Assessment of Aircraft Noise

As the reports of all of the Technical Subcommittees had been received prior to the coffee break the Advisory Committee continued its meeting by receiving some other reports of interest. The first of these was a report on Assessment of Aircraft Noise which had been requested by the 1969 meeting of the Alberta Advisory Committee on Pollution Control. This report was presented by Dr. P. B. Rose, Deputy Minister of Health. It is attached to these minutes as Appendix AK. Discussion of the report is contained in Appendix AL to these minutes.

Report on Research Project to Evaluate the Health Effects of Air Pollution

Dr. E. S. O. Smith, Division of Epidemiology, Department of Health, read a progress report on a study being conducted to evaluate the health effects of air pollution. This is the second such progress report, the first having been presented to the 1969 meeting of the Advisory Committee. The report is attached to these minutes as Appendix AM. Following the presentation of the report there was discussion which is included in Appendix AN to these minutes.

Report on Management of Pesticides and Pollution Control

Mr. J. B. Gurba, Head, Crop Protection and Pest Control, Department of Agriculture, presented a report on the management of pesticides and pollution control. This report is attached to these minutes as Appendix A0. The discussion which followed the report is contained in Appendix AP to these minutes.

Report on Zama Lake Oil Development in a Sensitive Ecological Environment

Mr. William L. Grossman, a representative of the Canadian Petroleum Association (Alberta Division), presented a report on Zama Lake Oil Development in a Sensitive Ecological Environment. This report is contained in Appendix AQ to these minutes. At the conclusion of Mr. Grossman's report the chairman asked members of the Advisory Committee to defer discussion as further reports on different aspects of the same subject would be presented during the meeting.

Report on Pollution Control by the Alberta Medical Association Committee on Public Health

Dr. I. D. McIntosh, representing the Alberta Medical Association, discussed the Alberta Medical Association's report on pollution control. Dr. McIntosh did not read the report as it had been circulated to members of the Advisory Committee prior to the meeting. It is contained in Appendix AR to these minutes. Dr. McIntosh did, however, discuss certain significant points in the report and listed six resolutions which arise from the report. These are contained in Appendix AS. Following Dr. McIntosh's presentation there was discussion which is contained in Appendix AT to these minutes.

Report on a Preliminary Look at the Effects of Oil Spills on Land Productivity

Mr. A. F. Manyluk, Deputy Chairman of the Oil and Gas Conservation Board, presented a report on a preliminary look at the effects of serious oil spills on land productivity. Mr. Manyluk's report on this subject, being rather lengthy, was not read during the meeting but is attached to these minutes as Appendix AU. Mr. Manyluk read an abstract of his report which is attached to these minutes as Appendix AV. The discussion which followed the reading of the abstract is contained in Appendix AW to these minutes.

Noon Recess

The meeting adjourned at 12:00 noon for lunch which was provided by the Government of Alberta.

Thursday Afternoon Session, November 26, 1970

Opening

Mr. M. R. Parker, a representative of the Alberta Association of Municipal Districts and Counties, chaired the final afternoon session. As reports which were not expected at the time the agenda was prepared were to be presented to the meeting the program for the last afternoon was varied from that shown on the prepared agenda.

Report on Operation of Surface Reclamation Council

Mr. Hubert H. Somerville, Deputy Minister of Mines and Minerals, presented a report on the operation of the Surface Reclamation Council. This report is contained in Appendix AX to these minutes. The chairman asked that discussion of the report be deferred and combined with the discussion of the following report due to a similarity of subject matter.

Report on Environmental Considerations in the Issuance and Administration of a Lease for Coal Mining

Mr. John Markovich of the Department of Mines and Minerals presented a report on environmental considerations in the issuance and administration of a lease for coal mining. This report is contained in Appendix AY to these minutes. Discussion on this and the preceding report is contained in Appendix AZ to these minutes.

Report on Pollution Prevention in the Zama and Hay Lakes Area

Mr. V. E. Bohme, a representative of the Oil and Gas Conservation Board, reported to the committee on pollution prevention in the Zama and Hay Lakes area. His report is contained in Appendix BA to these minutes.

Following the presentation of the report the chairman called for discussion of this report and the report presented earlier on Zama Lake Oil Development in a Sensitive Ecological Environment. The discussion is contained in Appendix BB to these minutes.

Report on Testing of Dual Fuel Vehicles

Mr. Gordon Cameron, Canadian Gas Association, presented a report on the testing of Dual Fuel Vehicles using natural gas and implications regarding the application of sales tax. His report is contained in Appendix BC. The discussion which followed this report is contained in Appendix BD to these minutes.

Moving Picture on Air Pollution in the City of Calgary

Dr. E.L. Tollefson, of the University of Calgary, referred to certain occasions on which there had been a certain amount of air pollution in the City of Calgary. His remarks are contained in Appendix BE to these minutes.

Following Dr. Tollefson's remarks, Mr. J. J. Havlena of the University of Calgary showed some moving pictures showing the air pollution. At the conclusion of the moving pictures the chairman opened the meeting for consideration of other items of pollution and for further discussion of any of the reports which had been presented. Professor R. W. Longley of The University of Alberta opened this discussion with some remarks on the diffusion of sulphur dioxide. Professor Longley's remarks and those of others which were presented at this time are contained in Appendix BF to these minutes.

At the end of this portion of the program the meeting recessed briefly for coffee.

Summary Report on Meeting - Water Pollution

Following the break for coffee the chairman called on Mr. V. E. Voegel, one of the committee's consultants, to give his views on matters covered during the meeting. Mr. Voegel's summary report is attached to these minutes as Appendix BG.

Summary Report on Meeting - Air Pollution

Dr. W. L. Faith as the consultant on air pollution gave his views on matters covered during the meeting. Dr. Faith's summary report is attached to these minutes as Appendix BH.

Summary Report - Chairman, Environment Conservation Authority

Dr. Walter Trost, Chairman, Environment Conservation Authority, presented a report summarizing his opinions on the matters which had been discussed during the meeting. This report is attached to these minutes as Appendix BI.

Concluding Remarks by the Minister of Health

The chairman now called on the Honourable Mr. J. D. Henderson, Minister of Health. Mr. Henderson presented the concluding address which is attached to these minutes as Appendix BJ.

Adjournment

The meeting adjourned at 5:05 P.M., November 26, 1970.

L. E. Stewart, Secretary
Alberta Advisory Committee
on Pollution Control

APPENDIX A

List of Persons Registered for Meeting of the Alberta Advisory Committee
on Pollution Control
November 25 and 26, 1970

PROVINCIAL GOVERNMENT REPRESENTATIVESDepartment of Health

Honourable Mr. J. D. Henderson	Minister of Health and Committee Chairman
Dr. P. B. Rose	Deputy Minister of Health
Mr. H. L. Hogge	Director, Environmental Health Services
Mr. J. P. Matheson	Director of Health Education
Dr. E. A. O. Smith	Provincial Epidemiologist
Dr. C. R. May	Director, Division of Industrial Health Services
Mr. L. K. Smith	Division of Industrial Health Services
Mr. E. E. Kupchanko	Head, Water Pollution Control Section, Division of Environmental Health Services
Mr. S. L. Dobko	Head, Air Pollution Control Section, Division of Environmental Health Services
Mr. R. N. Briggs	Head, Municipal Engineering Section, Division of Environmental Health Services
Mr. L. E. Stewart	Chief Public Health Inspector and Committee Secretary

Department of Lands & Forests

Mr. E. C. Wyldman	Watershed Section
Mr. G. M. Smart	Mineral Exploration and Development
Mr. Paul Paetkau (for Dr. S. B. Smith)	Fish & Wildlife Section

Department of Agriculture

Mr. Norman Thomson (for Dr. E. E. Ballantyne, Deputy Minister)	
Mr. R. E. Bailey	Director, Water Resources Division
Dr. J. G. O'Donoghue	Director, Veterinary Services Division
Mr. J. B. Gurba	Head, Pest Control & Crop Protection

PROVINCIAL GOVERNMENT REPRESENTATIVES (Cont'd)

Department of Agriculture (Cont'd)

Mr. Lloyd D. Sadler

Branch Head, Soils, Geology & Groundwater,
Water Resources Division

Mr. A. W. Goettel

Head, Soils Branch, Plant Industry Division

Dr. G. R. Whenham

Assistant Director, Field Services
Veterinary Services Division

Department of Industry & Tourism

Mr. H. E. Martin

Director, Publicity and Advertising

Department of Education

Mr. E. A. Torgunrud

Associate Director, Elementary Education

Department of Highways

Mr. L. G. Bussard

Director, Highway Shop and Equipment

Mr. W. Wandzura

Stock Advance Branch

Oil and Gas Conservation Board

Mr. A. F. Manyluk

Deputy Chairman

Mr. V. E. Bohme

Manager, Development Branch

Members of Legislative Assembly

Mr. W. J. Yurko

M.L.A., Strathcona East

Dr. Walter Buck

M.L.A., Clover Bar

Mr. Neville S. Roper

M.L.A., Ponoka

FEDERAL GOVERNMENT REPRESENTATIVES

Department of National Health & Welfare

Mr. J. Grainge

Regional Engineer, Northern Region

Department of Transport

Mr. C. E. Thompson (for Mr. D. H. Smith, Regional Meteorologist)

Department of National Defence

O. Johnson (for Dr. J. B. Reesor)

W. L. Montgomery (for Mr. H. J. Fish)

FEDERAL GOVERNMENT REPRESENTATIVES (Cont'd)Department of National Defence (Cont'd)

Mr. B.J. Perry

Department of Energy, Mines and Resources

Mr. S. Reeder (for Dr. A. T. Prince, Director of Inland Waters Branch)

Canada Department of Agriculture

Dr. W. O. Haufe Head, Veterinary-Medical Entomology Section

Dr. D. C. MacKay Head, Soil Science Section

Mr. H. A. Friesen Chief, Crop Management and Soils Section

Mr. K. H. Hutchings Plant Products Division

NON-GOVERNMENT REPRESENTATIVESCity of Edmonton

Mr. S. J. Hampton Commissioner

Dr. G. H. Ball Medical Health Officer

City of Calgary

Mr. A. Nicholson Commissioner

Dr. L. C. Allan Medical Health Officer

City of Lethbridge

Mr. E. Lawrence Engineering Director

Alberta Assoc. of Municipal Districts & Counties

Mr. M. R. Parker Director

Mr. Art Wigmore Director

Unifarm

Mr. P. E. Duby

Mr. J. R. McFall

Canadian Manufacturers' Association (Alberta Division)

Mr. W. Bannister Vice-President of Production, Inland Cement Industry Ltd.

NON-GOVERNMENT REPRESENTATIVES (Cont'd)Canadian Manufacturers' Association (Alberta Division) (Cont'd)

Mr. M. Roman	Technical Superintendent, Edmonton Imperial Oil Refinery
Mr. P. Routledge (for Mr. T. E. Engman, Manager, Burns & Co. Ltd., Calgary Plant)	
Mr. L. D. Loney	Manager, Quality Control and Development, Northwest Nitro-Chemicals Ltd.
Mr. J. Bowersock	Production Superintendent, North Western Pulp & Power Co.
Mr. H. M. Hayward	Superintendent of Operations, Canadian Sugar Factories

Alberta Fish and Game Association

Mr. Henry Lembicz

Canadian Water Resources Association

Mr. D. Broadfoot	Secretary-Manager
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University of Alberta

Prof. R. W. Longley	Professor, Department of Geography and Specialist in Meteorology
Prof. J. R. Nursall	Professor, Department of Zoology
Prof. P. H. Bouthillier	Professor, Department of Engineering

University of Calgary

Dr. E. Tollefson	Department of Chemical Engineering
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University of Lethbridge

Prof. Paul Lewis	Department of Biological Sciences
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Association of Professional Engineers of Alberta

Mr. R. F. Comstock	Capital Development Officer
Mr. P. D. Lawson	Reid, Crowther & Partners Ltd.

Alberta Association of Architects

Mr. H. Williams	H. Williams Architects
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Canadian Medical Association (Alberta Division)

Dr. J. M. Howell	Medical Officer of Health Sturgeon Health Unit
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NON-GOVERNMENT REPRESENTATIVES (Cont'd)Consumers Association of Canada - Alberta Prov. Assoc.

M. C. Davidson Member of Board

Alberta Tuberculosis Association

Mr. J. M. McKenzie General Secretary

Canadian Petroleum Association (Alberta Division)

Mr. W. L. Grossman Vice President, Shell Canada Ltd.

Canadian Electrical Association

Mr. T. D. Stanley

Canadian Gas Association

Mr. G. R. Cameron Executive Assistant, Northwestern Utilities Ltd.

Canadian Natural Gas Processing Association

Mr. F. B. Matthews

Coal Operators' Association

Mr. G. W. Barnes

Peace River Area

Mr. N. E. Stanley Agricultural Fieldman, M. D. of Peace #135

Edmonton Chamber of Commerce

Mr. T. A. Edwards Chairman, Municipal Affairs Committee

Alberta Chamber of Commerce

Mr. J. E. Baugh Representing Alberta Chamber of Commerce

Calgary Chamber of Commerce

Mr. J. E. Baugh Chairman, Pollution Committee

Anti-Pollution Organizations

Mr. D. C. Wighton S.T.O.P. (Save Tomorrow Oppose Pollution)

Dr. J. A. Farr Pollution Control - Southern Alberta

Consultants

Dr. W. A. Faith Air Pollution Consultant, San Marino, California

Mr. F. A. Voegelé Ontario Water Resources Commission, Toronto

NON-GOVERNMENT REPRESENTATIVES (Cont'd)Observers

<u>Name</u>	
H. Thiessen	Department of Agriculture
L. J. Reid	Department of Agriculture
L. Alexander	Western Industrial Laboratories Ltd.
G. L. Brown	Canadian Petroleum Association (Alberta Division)
E. E. Cudby	Canadian Petroleum Association (Alberta Division)
W. A. Flook	Canadian Petroleum Association (Alberta Division)
E. Tipman	Canadian Petroleum Association (Alberta Division)
Al Nordstrom	Canadian Petroleum Association (Alberta Division)
V. B. Cook	University of Alberta
V. Machander	University of Alberta
J. Pospisilik	University of Alberta
Dr. Drake Hocking	Edmonton Anti-Pollution
W. E. Stevens	Canadian Wildlife Service
K. Vermeer	Canadian Wildlife Service
E. H. Watson	Texaco Canada
H. Weikum	East Edmonton Business Assoc.
V. Osinchuk	Research Council of Alberta
R. Anderson	Edmonton Fish & Game Association
H. Krusche	Local Board of Health, City of Edmonton
J. A. McAfee	East Edmonton Business Association
H. R. Littke	City of Edmonton
G. J. Smith	Department of Fisheries & Forestry
E. Gautreau	Department of Fisheries & Forestry

NON-GOVERNMENT REPRESENTATIVES (Cont'd)Observers (Cont'd)

Dr. K. Ball	University of Alberta
R. J. Patterson	Fish & Wildlife Division
J. J. Havlena	University of Calgary
T. Nowicki	Department of Lands & Forests
D. Gillman	Department of Lands & Forests
R. Blauel	Department of Fisheries & Forestry
Mrs. B. Hocking	Edmonton Anti-Pollution Group

News Media

D. Thomas	Calgary Herald
Vicky Martin	Edmonton Journal
J. G. Armit	CHED
Herb Johnson	Lethbridge Herald

APPENDIX B

ALBERTA ADVISORY COMMITTEE ON POLLUTION CONTROL
4th Meeting
November 25-26, 1970

A G E N D A

WEDNESDAY, NOVEMBER 25

8:30 - 9:00 a.m. Registration

Morning Session - Chairman, Mr. W. Bannister

9:00 a.m. - Address by Honourable J. D. Henderson.

- Updating report on pollution control work:

Air Pollution Mr. S. L. Dobko

Water Pollution Mr. E. E. Kupchanko

Waterworks and
Sewerage Systems Mr. R. N. Briggs

10:00 a.m. - Coffee

10:20 a.m. - Comments from Consultants:

Dr. W. L. Faith, San Marino, California

Mr. F. A. Voegelé, Ontario Water Resources Commission

Theme for comments: "Multiple Use of Environment and
Resources"

- Open discussion on the "Theme" subject

12:00 noon - Luncheon

Afternoon Session - Chairman, Mr. P. D. Lawson

1:00 p.m. - Presentation of reports by subcommittees:

Air Pollution - Calgary

Water Pollution - North Saskatchewan River

Air Pollution - Edmonton

Water Pollution - Bow River

Water Pollution - Oldman River

Air Pollution - Sour Gas and Oil Industry

AGENDA

WEDNESDAY, NOVEMBER 25

3:00 p.m. - Coffee

3:20 p.m. - Soil Pollution

Noise

Air Quality Criteria

Water Quality Criteria

Air Pollution Research

THURSDAY, NOVEMBER 26

Morning Session - Chairman, Mr. A. Nicolson

9:00 a.m. - Presentation of reports by subcommittees (cont'd)

Water Pollution Research

Information and Education

Water Pollution Control - Oil and Gas Industry -
Drilling and Production

10:00 a.m. - Coffee

10:20 a.m. - Report on Assessment of Aircraft Noise - Dr. P.B. Rose

- Progress Report on Air Pollution Research Project -
Dr. E.S.O. Smith

- "Management of Pesticides and Pollution Control" -
Mr. J. B. Gurba

- "Zama Lake - Oil Development in a Sensitive Ecological
Environment" - Mr. William L. Grossman

- "Report on Pollution" by the Alberta Medical
Association's Committee on Public Health

- "A Preliminary Look at the Effects of Serious Oil Spills
on Land Productivity" - Mr. A. F. Manyluk

12:00 noon - Luncheon

AGENDA

THURSDAY, NOVEMBER 26

Afternoon Session - Chairman, Mr. M. R. Parker

- 1:00 p.m. - "Environmental Consideration in the Issuance and Administration of a Lease for Coal Mining" -
Mr. John Markovich
- "Pollution Prevention in the Zama and Hay Lakes Areas" -
Mr. V. E. Bohme
- New Subcommittees
- Review of special items requiring further discussion
and finalizing
- 3:00 p.m. - Coffee
- 3:20 p.m. - Comments and Summaries
 - Mr. Fred A. Voege
 - Dr. W. L. (Larry) Faith
 - Dr. Walter R. Trost, Chairman,
Environment Conservation Authority
 - Honourable J. D. Henderson,
Minister of Health and
Chairman, Alberta Advisory Committee on
Pollution Control

Appendix CADDRESS OF THE HONOURABLE J. D. HENDERSON, MINISTER OF HEALTHDELIVERED AT THE OPENING SESSION OF THEFOURTH ANNUAL MEETING OF THE ALBERTA ADVISORY COMMITTEEON POLLUTION CONTROL

Good morning ladies and gentlemen. It is a pleasure to welcome everyone this morning to another Annual Conference of the Pollution Advisory Committees. I would particularly welcome those who are attending for the first time, as well as the observers of the Edmonton and Calgary anti-pollution groups. I would like to say to them that they join a group of people who have long been involved in, and concerned about, the question of pollution control - individuals who have generously made their time and expertise available to the government through this Advisory Committee in order to assist with development of programs and policies to deal with the many pollution problems.

I would like to deal very briefly this morning with three areas - firstly, the question of government policy changes in the past year; secondly, the future of the Advisory Committees; and thirdly, the general question of pollution and multiple utilization of our natural resources.

Initially let me discuss the subject of government policy changes. You will recall that a major concern expressed last year by this committee was one of a need for an overall co-ordinating body in the field of pollution control management. Also that the body would assist the Advisory Committees in their important work. Following the conference last year, we met a number of times with various committee chairmen and as a consequence started in motion a proposal for a 10-man co-ordinating body. We eventually settled on a 3-man body and the legislation for the creation of the Environment Conservation Authority was passed last spring. I would like to emphasize that the Authority was a direct outcome of the recommendations developed by this Committee. The Authority may not exactly conform to the ideas envisioned here; however, we concluded that in order to have a vehicle for looking forward at all times and one with which the volunteer organizations, groups and this Advisory Committee could work on an on-going basis, it was preferable to have a co-ordinating body that was not tied down to any day-to-day operational responsibilities. Secondly it should be a body that would not be, by virtue of being involved in operations, eventually bound up in the prejudices of its own past mistakes.

Our expectations are that the 3-man Environmental Conservation Authority will fulfill a role, in the simplest terms, of the environmental ombudsman, having access to all government records and information. It would also be occupied with looking to the future, which obviously involves some dealing with today's problems. It will be a body to which the public will have access at all times, a body to which the government will look to for advice on policy matters - matters which I am sure you are aware are going to become increasingly a subject of political debate. It will be an independent body which will be one step removed from government and, hopefully, will be able to set itself above the realm of politics, in which the subject inevitably becomes embroiled.

The Chairman of the Authority has been appointed. Dr. Walter Trost is here this morning and I am certain you will have an opportunity to get acquainted with him later in the day. The second and third members of the Authority should be appointed within the next two or three weeks - certainly before Christmas. Dr. Trost has his offices in the Devonian Building and shortly after the first of the year it is the intention of the government to refer the first major issue - most likely aspects of the wilderness area question - to him.

One of the other changes that is going to come about in the next year, and indirectly it is also the outcome of some of the recommendations and concerns expressed by this particular body, is the decision to establish a new department of the government. The new department has tentatively been named the Department of Environmental Improvement.

I would like to repeat the decision to establish this new department was based partly on the views and attitudes that have been expressed in the Advisory Committee. It was also the outcome of a substantial re-organization and re-structuring proposed for the Department of Health. It was quite apparent to all of us that the public was not aware that any substantial pollution control efforts were under way in the province. This, no doubt, is attributable to the fact that the programs have been buried within the Department of Health, which is the largest single department of the government and has one-third of the civil servants employed. Needless to say, while pollution gets a great deal of coverage in the news media in comparison with other problems in the department (Medicare, hospitals, health services, etc.) it still became quite apparent that the time had come to elevate the profile of the pollution control programs.

A third factor for establishing the new department is becoming increasingly clear. It is not really a question of pollution, but rather a question of total environmental management. It is obviously expedient to establish one central department with overall responsibilities for establishing standards and criteria in the overall area of environmental management.

One of the major tasks of the new department will be to effectively co-ordinate and aggregate the interests and demands for further resource development and reconcile these concerns with those of the conservationists.

Another factor in the decision to establish a new department was the Canada Water Act. This legislation was initially aimed at water management. However, when it was finally unveiled, the dominant factor in it became pollution control. Needless to say, with water resource management under the Department of Agriculture and with water pollution control programs under the Department of Health, it was obviously desirable to place total water management, quality and quantity control under one body. Thus, the new Department of Environmental Improvement will have direct responsibility for, and sole concern with, the overall question of management of our natural resources of air, water and land.

One of the aspects that the new department will find most difficult to deal with is the question of land, its utilization and the effect of resource development upon it. I will return to this topic in more detail later in my remarks.

The new department will continue to have the responsibility for the programs that now exist within the Environmental Health Division. It will also operate the programs of water management that are now found in both the Department of Health and the Department of Agriculture, and in addition will have responsibility in future for the establishment of standards and criteria in the realm of land management, especially as it relates to mineral resources development.

This new department is not going to necessarily be directly responsible for enforcement of all programs. If we attempted to place every aspect of pollution enforcement under this department, we would end up with half the government in the Department of Environmental Improvement - a significant part of the Oil & Gas Conservation Board, everything to do with coal mining, automobile pollution, fish and game management, etc., would be in the department. Therefore, the basic responsibility of the department will be to establish environmental standards and criteria and at the same time act within the framework of delegation of enforcement to other departments. We are anticipating, however, that the new department will be the voice of the last resort within the government on environmental matters.

Next I would like to comment on the future of these advisory committees. I believe it is self-evident that with the change in government structuring, the establishment of the new department and the Environmental Conservation Authority, we must review the function and role of the Advisory Committee as well as its direct relationship to government.

I would like to suggest for your consideration during the conference that it might be desirable that the responsibility for the advisory committee be transferred to the Environmental Conservation Authority. I suggest this for a number of reasons - the major one being that this action clearly conveys that with the public concern over pollution, and given the emotional reaction to the problem, the problem is nonetheless a real one. These concerns are going to be here for a long time to come and like all things in our democratic system, when the issue is one of public debate, it immediately becomes a significant element in the political arena. I am sure you are aware that the realm of partisan politics produces some peculiar situations. Therefore, I believe that in transferring the responsibility for the advisory committee to the authority, it will be a significant step in attempting to keep the positive, constructive contribution that you are making in this area removed one step from partisan political politics. This step would be in keeping with the decision to set up the Authority - to have a body solely preoccupied with the environment and the future need for new programs and services which, in turn, would deal effectively with the problems of pollution. Therefore, in assigning the committee's responsibility to the Authority, it will provide a better opportunity for the committees to make a positive contribution removed from politics.

I would also like to suggest that included within the committee arrangement should be a group looking at the questions of jurisdiction. This is going to be a long-term problem which, in the final analysis, is probably going to be one of the major hurdles that we will have to overcome in the field of pollution control.

The introduction of the Canada Water Act by the Federal Government and their anticipated introduction of air standards, will no doubt make the

issue of jurisdiction more complex. An excellent example of the jurisdiction problems is the Athabasca Delta. The Delta is within the National Wood Buffalo Park, the dam is in British Columbia and the Peace River flows through Alberta. The jurisdiction question, I believe, is one of the reasons why the difficulties in the Delta developed.

I also believe that there is a need within the committee structure for a group specifically concerned with the question of pesticides and chemicals. My own opinion is that in the future, given the environmental consequences, these substances will probably be the major hazard. The knowledge that is available in the area is extremely sparse and no one can accurately predict the outcome of many of the products that are synthetically manufactured. These substances are introduced into the environment and nature does not have the capability to digest them, to break them down and return them to their natural elements.

I would also suggest that we introduce into the committee structure some concentration on land - reclamation standards, land utilization for mineral resource industries and for recreation, etc. Increasingly, it appears to the government that this major subject is going to be one of the long-term public debate and public concern.

This brings me to the third item - the question of pollution and resource utilization. In the past few years the word 'pollution' has been bandied about so frequently and used in so many contexts so as to render it almost meaningless. I hear comments that the architecture at the University of Calgary has been described as 'visual pollution'. We also talk of 'noise pollution'. In addition, some discuss any disturbance in the balance of nature as pollution. I believe it is imperative that we draw our attention from pollution to a question of multiple utilization of our resources of land, air and water.

There is a tendency to think of pollution in absolute terms. Of course we all know it is not an absolute problem, but a relative problem. Most individuals who are sincerely concerned about the problems of pollution of the environment and conservation must by nature have a schizophrenic dilemma. On the one hand we have a very legitimate and sincere concern about the effects of man upon his environment (the pollution aspects); while on the other hand we have a goal, when viewed in absolute terms, would have a major effect upon our economy.

Much of our high standard of living is based directly on the successful exploitation of our rich natural resources. Viewing pollution in absolute terms would simply bring to a halt a major portion of the present resource development. Therefore, the question of land management is a key factor. Politically we cannot continue to tolerate air, water and chemical pollution. The solution to the land utilization problem, however, will be much more complex.

It is a fundamental fact that Alberta sits on one of the largest accumulations of fossil fuels in the world, with oil and gas reserves approximating ten billion barrels (the tar sands alone have three hundred million barrels of recoverable oil), with coal reserves of approximately 47 million tons. At the present rate of production, we have a proven oil reserve which would last 850 years and a proven coal reserve which would last 1200 years. Therefore, if we are to continue to enjoy the material benefits of utilizing

our resources in this province, we must look at the magnitude of the fossil fuels in Alberta on one hand and balance this with the necessary disruptive effects that extracting these resources has upon certain aspects of the environment for a limited number of years. It will be a task of considerable magnitude to ensure that the disruptive effects to the land, air and water will only be for a comparatively few years.

Thus, we have a real need for some long-range planning in the area of land management. I am confident that we will be able to devise absolute preventative solutions to deal with water and air pollution, however, the environmental disruption aspects of mineral resource development are going to be with us in Alberta for many years to come.

I would predict that this issue will be the subject of more heated, on-going debate in this province than anywhere else in Canada. With a high proportion of the population of Alberta concentrated in Calgary and Edmonton, and with the high recreation potential lying in close proximity of the Foothills area, it becomes readily apparent that there will be constant tension between the interests for wilderness recreation areas and those for mineral exploitation. As the population increases, there will be an increased need for both mineral exploitation and recreation areas and thus the conflict will be with us for generations to come.

In conclusion, I would reiterate that I hope we will re-examine the committee structure along some of the lines I have suggested. I would also ask that you view pollution in relative terms. There certainly must be absolute minimum standards, but the application of these standards must be balanced with the material needs and benefits gained by the citizens of this province and Canada through multiple resource development.

Mr. Chairman, I am looking forward to hearing the discussions and presentations over the next two days. Thank you.

Honourable J. D. Henderson
Minister of Health

Appendix DANNUAL SUMMARYAIR POLLUTION CONTROL PROGRAM

Thank you Mr. Chairman. Honourable Henderson, members of the Advisory Committee and observers, as Mr. Chairman has pointed out the day-to-day work has not lagged whatsoever in the face of the new reorganization, but perhaps he is not aware that nothing has filtered down to us as yet, so as it stands now we don't feel that there is going to be a lag. I think that we are staffed rather sufficiently to carry out the work to the best of our abilities. Over the past year there have been some changes instituted in the policy and objectives in the pollution field. This does not preclude that we have relaxed in the direct assessing, controlling and reducing pollution where necessary. Public awareness over the last couple of years has come to a very high note and in the face of this we were saddled with a considerable extra load in the form of presentations throughout the province, speaking to all types of groups interested in the type of pollution problems we encounter and the types of work, controlling work that is being carried out. With this awareness and this concern by the public, the philosophy has changed to some extent in that more and more of the information, this is the monitoring information, the likes of that is being made available to the public. We are not a printing shop, we do not have extra-copious extra quantities of these reports available, these are available in our office and can be looked at any time.

Major achievements. Basically amount to four different items. The first was the establishment and the commencement of a joint health effects of air pollution research project, the air pollution section has been given the duty to be in charge of the sampling program, involving 13 stations sampling total suspended particulates. I should say the program started around February and to date we have got in the vicinity of 350 to 400 samples. I think this will be further expanded in a report tomorrow afternoon by Dr. E. S. O. Smith.

The second major achievement for the year was the establishment of air qualities standards. This has been a joint co-operation, first at the provincial level wherein Alberta, Saskatchewan and Manitoba jointly adopted standards which were generally acceptable by all three provinces. Following this, the standards were presented to the Air Quality Criteria sub-committee for review and having reviewed this completely and various things were instituted, some I might say were over-ruled by the legal body, the Provincial Board of Health who finally adopted these standards in September. The changing picture required a major step in changing the basic regulations which are in force in the province. The main item that came under fire, I should say as the result of fire, smoke, was the particular section that was changed. With the new philosophy of don't allow pollution to occur, the major step in the smoke regulations was to totally eliminate the emission of #4 #5 density smoke, which were allowed in rural areas up until, well the change with the regulations coming into effect some time in December.

Changing that allowable level we did change some of the allowables in the major urban areas and the smaller urban areas and it is worked on some type of a sliding scale.

The fourth policy change, I will not call it an achievement, it is an achievement in its own respect on a working level, but the policy change as the Minister mentioned was turning over the air pollution control work of the gas processing plants completely to the Oil & Gas Conservation Board. Prior to this time, any operator was required to go to - well the two major agencies, as far as we are concerned, they have taken into count some of the jurisdiction from other departments, but we are far too busy on our own to look at this completely, but the conservation angle was the jurisdiction of the Conservation Board and the pollution control was under the jurisdiction of the Department of Health. Combining these makes for a more effective work group and the Department of Health sets up the required standards which the Oil & Gas Conservation Board is applying. So far - the change was effective 1st of August, so far I would say that the arrangements have been very effective, there has been very close consultation between the two groups. So far I think it is to the betterment of all. I see my time is running out very quickly. I have some other specific points. Our general program was not decreased because of these program changes, we have taken quite a progressive step I feel in establishing the Calgary office with the placement of a senior technician at that office, this does help us very greatly and in setting up that system I say that that is the initiation of our eyes and ears for Calgary and it has proven very effective so far.

Various committee work has been established which is the result of the concern on pollution, some of these may seem to be a little farfetched, but this is the coming thing. The first committee on which I am a representative of Alberta is an interdepartmental committee on resource satellites and remote air-borne sensing. This is sensing of air pollutants from space satellites. There have been two meetings set up as Federal-Provincial meeting on air pollution of control officials. This is the sounding board of all provincial programs and federal programs and the third committee is the Canadian Standards Association, which it is hoped will set up a standard analytical procedure or instrumentation procedures to be utilized clear across Canada, so that all results can be relatable and where jurisdictional problems occur, then they will have some meaning.

For the future the program is to expand mobile urban monitoring or to expand urban monitoring by getting a mobile urban monitor. It was hoped to be able to get a mobile urban monitor for both of the cities and to expand the ambient monitoring in the rural areas, due to economic situation that prevailed in Canada over the last two years this is directly showing up, we were unable to expand as required, and for the future I am very hopeful that things will change.

S. L. Dobko, P.Eng.,
Head
Air Pollution Control Section

Appendix EANNUAL SUMMARYWATER POLLUTION CONTROL PROGRAM

Honourable Minister, Ladies and Gentlemen, members of the legislative assembly, this cold weather brings to mind a story - I kind of feel sorry for Larry Faith coming up from California. He continuously reiterates the old story when he was up here about ten years ago that one very cold day when it was about 20 below he put a glass of water by a window sill and it froze right there - just froze, and he has never forgotten this. Every time I see him he usually reiterates this story.

While thinking over some of our accomplishments over the past twelve months or so, I can't help but sense a somewhat different attitude toward pollution control since the last time we met. The increased attention focused on the environment has already changed the values of many of us here. Concern certainly has shifted from quantity to quality, from the desirability of growth to the desirability of stability. As Christian de Lait, Secretary General of the Canadian Council of Resource Ministers put it the other day, "There is no solution for pollution." The best we can hope to do is to control it. Pollution can be considered as inefficient resource management. And so our emphasis has changed environmental problems cut across many jurisdictions and disciplines and our focus had to be broadened to cope with the problems.

Since the last Alberta Advisory Committee meeting we became involved in several task forces and study groups under the auspices of the Conservation and Utilization Committee, the Water Resources Division, Fish and Wildlife Division, Department of Agriculture, Eastern Rockies, Conservation Board and Oil and Gas Conservation Board. We became involved in water quality studies at Gull Lake, Cooking Lake and water quality and thermal studies at Lake Wabamum. Water quality studies were made at several other lakes in the province. Unfortunately some of these studies had to be cut back somewhat because of limitations within the section.

As you know, a comprehensive monitoring program is necessary to determine the extent of pollution or improvement of water quality. Without such a program we can only react to pollution problems after they become serious enough for us to see. As in previous years surveys were conducted on the North Saskatchewan, Oldman, Bow, Athabasca and South Saskatchewan Rivers. Public meetings were held on the North Saskatchewan River, Oldman and Bow Rivers. The Red Deer River meeting was closed. These reports have been published and I'm sure most of you have the results of these surveys.

Since last year we have obtained an additional Robot Monitor and in conjunction with the one on the North Saskatchewan this will be put on the Red Deer River in which we are doing a fairly comprehensive assimilative capacity study.

A cooperative effort between our section and the Department of Agriculture was made to assess the contribution of pollution of water by animal wastes.

Since the last Alberta Advisory Committee meeting 38 approvals for the release and control of waste waters were issued by the section on the basis of stream assimilative capacity. These approvals incorporated limits on polluttional loads.

In addition to this 37 approvals were issued for chemical weed control and area insect control. Because we changed our regulations we became involved in insecticides when used in or near water courses.

Changes were made in our Water Quality Criteria. After considerable negotiation the three Prairie Provinces have a common water quality criteria based on the most sensitive use. Now these criteria with those of Ontario certainly will have a major influence on the Federal Government in any criteria or standards they might propose.

It's difficult in the time allotted to me to get into too much detail with regard to new developments in the section. One can only hit the highlights. I am looking forward with anticipation to the new Department of Environmental Improvement because we will be able to obtain more knowledge of the environment and as we gain this knowledge, policies, priorities and programs for their implementation will be set and with a systematic approach I'm sure we will achieve progress in meeting the environmental problems of tomorrow.

As I said before, our view of the environment and its value is changing and will continue to change. People in the end shape the environment. If a better environment is passed to future generations, it will be because of the values and actions of people like all of us here today.

Eugene E. Kupchanko, P. Eng.
Head
Water Pollution Control Section

Appendix FANNUAL SUMMARYWATERWORKS AND SEWERAGE SYSTEMS

This Section's responsibility is to ensure that all Municipal waterworks and sewerage systems are designed, installed, operated and maintained in such a manner that they will not constitute a hazard to the health of the Public.

Under the Public Health Act, any proposed new water and sewerage system, or extensions or alterations to these must be approved by the Provincial Board of Health prior to their construction. "Recommended Standards for Water Supply & Sewerage" have been published for use of Consulting Engineers in the preparation of their submissions. Drawings are reviewed by the Municipal Engineering Section and when acceptable are recommended to the Provincial Board of Health for approval.

To ensure that these systems are properly operated and maintained they are periodically inspected throughout the year. Operator's Schools and a water treatment correspondence course are conducted and a quarterly publication, "The Utility Operator" is published to help upgrade the level of operation and maintenance of the system.

Additional control is provided through reviewing monthly plant operating records. The chemical and Bacteriological quality of the water is continually reviewed.

Fluoridation records are reviewed for compliance with the regulations. Operating reports are reviewed from Municipal sewage treatment plants for compliance with discharge limits.

Any complaints resulting from the operation or maintenance of the system are investigated and hopefully resolved.

The Section also is involved with other Sections of the Division in regards to Sanitary Landfills, and facilities serving trailer courts.

There are now 247 Water and 248 Sewerage Systems in the Province. Figure I shows the growth of water and sewerage systems in Alberta since 1945. These new waterworks systems were installed in:

Barnwell	-	Water and Sewerage
Bruderheim	-	Water
Plamondon	-	Water and Sewerage
Rosedale	-	Water
Youngstown	-	Water

Table I provides a breakdown of the water and sewerage systems and provides statistics on the system. Of particular interest is the fact that over 75% of Alberta's population is serviced with water and sewerage.

To date there have been over 200 submissions recommended to the Provincial Board of Health for final approval of water and sewerage projects. The value of these approvals is over \$31,000,000.00 with approximately \$10,000,000.00 being spent on sewage treatment facilities.

Last year, there were seven communities with sewage collection systems that did not have sewage treatment. Table II lists the current status of systems (in population ranges) with the number of systems and those with treatment.

Of the seven that did not have sewage treatment, there are now only 2 without sewage treatment. These are the Town of Athabasca and the Townsite of Jasper. Both of these communities now have Engineering Studies with construction planned for the spring of 1971.

The status of the other five that originally did not have sewage treatment is as follows:

<u>Banff:</u>	Completion of aerated lagoon system scheduled by the end of November.
<u>Cardston:</u>	Construction of 4 anaerobic lagoons completed and in use.
<u>Peace River:</u>	Construction of 4 anaerobic lagoons completed and in use.
<u>Rocky Mountain House:</u>	Construction of 4 anaerobic lagoons completed and to be in use by the end of November 1970.
<u>Taber:</u>	Construction of anaerobic lagoons completed and in use. In addition the Town is currently constructing additional lagoons that will provide seven months storage. Following storage, the effluent will be used for irrigation purposes.

With reference to Table II, the following comments are of interest:

(a) NO WATERWORKS

1000 - 3000	Sylvan Lake (private wells)
300 - 1000	Bentley Sedgewick
300 - 500	Hythe Millet Sangudo Warburg Mirror

(b) NO SEWERAGE SYSTEM

1000 - 3000	Bellevue Fort Chipewyan
500 - 1000	Vermilion Hillcrest
300 - 500	Midlandvale Nacmine Mirror

The Town of Athabasca does not have sewage treatment at this time.

Figure II is a graphical presentation of the data in Table II.

This indicates that sewage-treatment-wise, we have an excellent record which is the best in Canada. To maintain this most desirable high standard of sewage treatment throughout the Province will require continued hard work in operator training, inspection, sampling and review of the systems.

A basic program has been prepared to ensure that the present high standard of waterworks, sewage collection and sewage treatment will be maintained throughout the Province, however, due to financial and staff limitations, its implementation will be somewhat slower. Priorities have had to be established in order to maintain the essential items of the program.

The year, 1970, Central Mortgage & Housing Corporation asked the assistance of the Province in allocating the Central Mortgage & Housing Corporation funds, under Part VIB of the National Housing Act for sewage treatment projects. The Province was allotted \$6,000,000.00 (to cover 2/3 of the cost of projects). To date we have recommended that projects totalling \$6,000,000.00 be accepted by Central Mortgage & Housing Corporation.

This year, we have continued our review of systems and have requested several sewage treatment systems to be upgraded and have obtained Provincial Board of Health Orders on others. The 1971 estimated amount of sewage treatment facilities and trunk sewers to be constructed is over \$15,000,000.00.

R.N. Briggs, M.Sc., P.Eng.
Head
Municipal Engineering Section

SUMMARYWaterworks

Total number of communities served.	247
Communities with waterworks system only	19
Communities using ground water only	126
Communities using surface supplies only	116
Communities using both ground water and surface supplies	5
No. of communities having filtered water (either pressure or gravity) not including slow sand filters	87
No. of communities using slow sand filters.	6
No. of chlorinated supplies	153
Iron removal units.	10
Total Population Served	1,194,062
Percent of Alberta Population Served	75.7

Sewerage

Total number of communities served.	248
Communities with sewerage system only	20
Communities using lagoons	213
Communities using primary treatment	27
Communities using trickling filters	2
Communities using activated sludge.	1
Communities using oxidation ditches	4
Communities using total oxidation	2
Communities using aerated lagoons	3
Total Population Served	1,194,757
Percent of Population Served	75.8

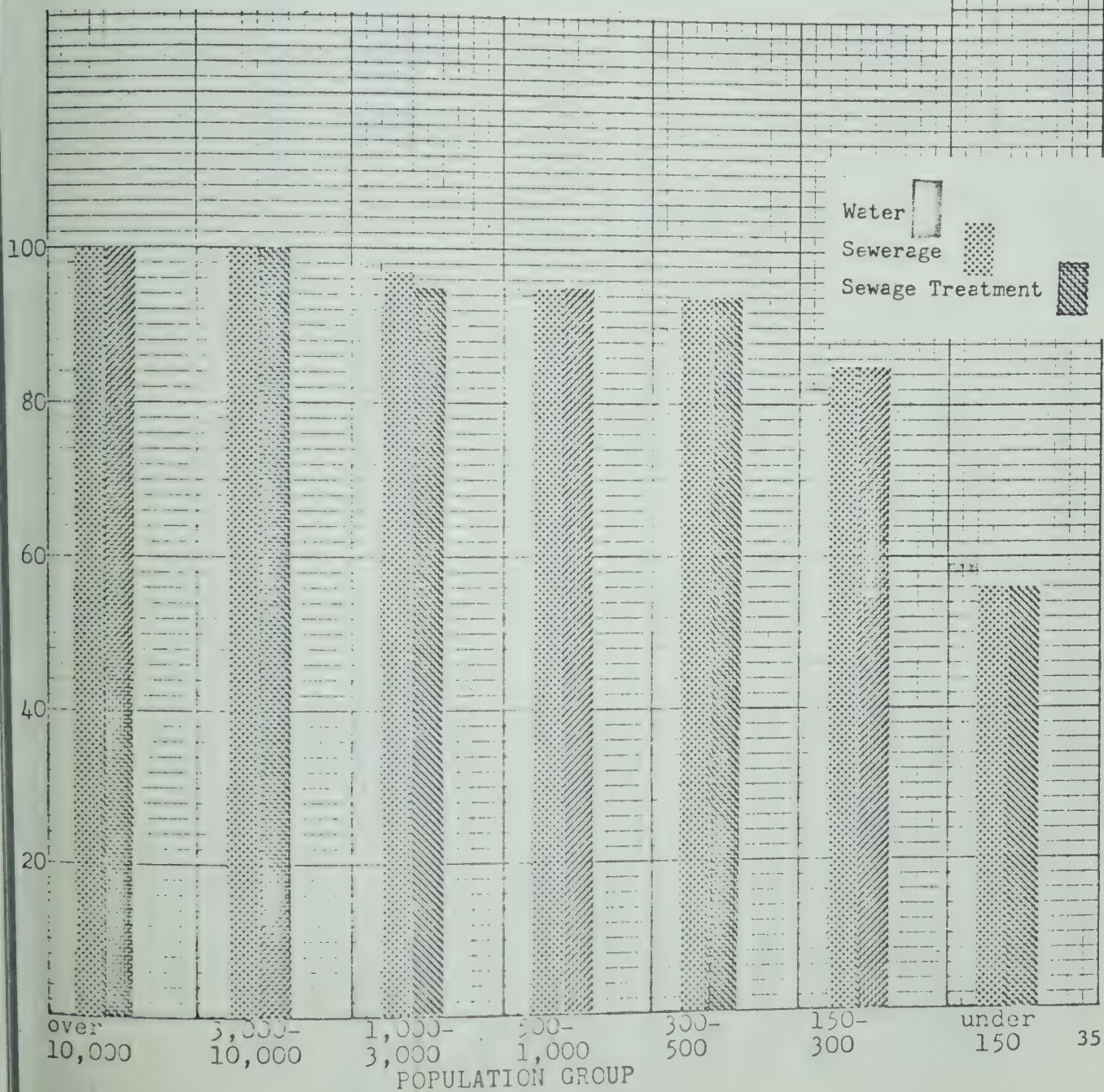
Population figures as established under the Municipal Assistance Act (1970).

TOTAL ALBERTA POPULATION - 1,576,549

Note: Banff, Waterton, Jasper and Lloydminster (Alberta portion) are not included except in the population served.



WATERWORKS AND SEWERAGE SYSTEMS IN ALBERTA COMMUNITIES 1970



1970 WATER, SEWERAGE AND SEWAGE TREATMENT SURVEY

Population Group	Number of Communities	Number Served With Waterworks	%	Number Served With Sewerage	%	Number With Sewage Treatment	%
Over 10,000	7	7	100	7	100	7	100
3,000 - 10,000	22	22	100	22	100	22	100
1,000 - 3,000	58	57	98	56	97	55	98
500 - 1,000	42	40	95	40	95	40	100
300 - 500	52	47	90	49	94	49	100
150 - 300	65	54	83	55	85	55	100
Under 150	34	20	59	19	56	19	100
TOTAL	280	247	88%	248	89%	247	99.6%
AVERAGE							

NOTE: Jasper; Banff; Waterton; Lloydminster; Hamlets with neither water nor sewerage systems; Institutions and Summer Villages are not included.



GROWTH OF WATERWORKS
AND SEWERAGE SYSTEMS IN
ALBERTA

240

200

160

120

80

40

Waterworks

Sewerage

1945

1949

1953

1957

1961

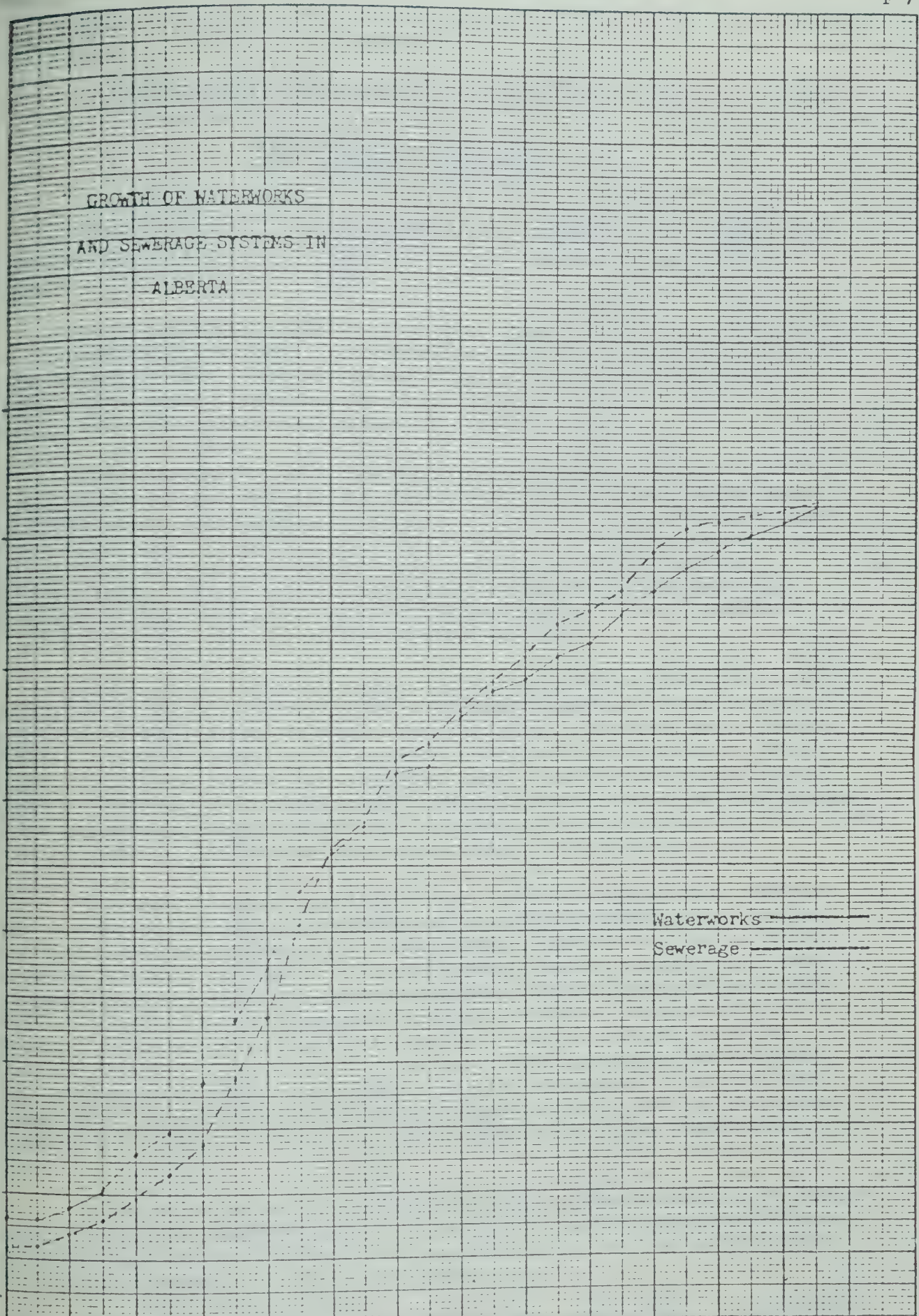
1965

1969

1973

YEAR

37



Appendix GMULTIPLE USE OF ENVIRONMENT AND RESOURCES - AIR

ADDRESS BY DR. W. L. FAITH
 Air Pollution Consultant
 San Marino, California

Multiple use of the environment is, of course, an established fact. Some uses are essential to life; others, perhaps not absolutely essential, contribute to the enjoyment of life.

The atmosphere provides us with the oxygen we breathe. It protects us from extreme heat and cold. It transports moisture from the oceans to the land and thereby allows plant and animal life to flourish over wide areas of the earth's land mass. And as a final essentiality it destroys through oxidation, the waste products of life (and death).

Less essential to life, but certainly desirable, is the contribution of oxygen in the air to controlled combustion needed for heat, light, power and transportation, the utilization of our natural resources (e.g., winning of metals from their ores), and the manufacture of the many synthetic materials (plastics, fabrics, etc.) so widely used in our present civilization. A further modern use of air is the conversion of atmospheric nitrogen into fertilizers, without which we could not feed ourselves. Some of this multiple use is not essential, but certainly desirable and good.

The question arises as to the nature and solution of our air pollution problem in the face of our highly efficient atmospheric waste disposal system. The problem arises from the fact that every essential and desirable use of the atmosphere emits waste products back into the atmosphere. Has then our atmospheric waste disposal system been overloaded? Taking the atmosphere as a whole, the answer is "No". More and more waste has been poured into the atmosphere as population has increased and civilization has progressed, and the atmosphere continues to absorb and destroy these wastes.

This waste disposal function comes about through several important cycles or systems, principally through carbon, nitrogen, and sulfur cycles. Basic to life is the carbon cycle in which oxygen converts carbon to carbon dioxide (CO_2) with a release of energy. Some of the CO_2 is converted back to oxygen (and essential carbonaceous complexes) by sunshine and plant life. Not all of the CO_2 in the atmosphere is removed by plant life; some is absorbed by the oceans; some returns to earth in rain or snow where it is removed by reaction with inorganic materials. Unfortunately, the half-life of CO_2 in the air is fairly long, and there are some indications of a slow buildup in the atmosphere with possible consequences of a change in the heat balance of the earth. Whether or not this change may become intolerable is moot.

In the case of sulfur entering the air as hydrogen sulfide or sulfur dioxide, the sulfur compounds appear to be fairly rapidly oxidized to SO_2 , SO_3 , and sulfate ion and returned to the earth in rain or snow. The half-life of SO_2 is probably as little as 4 days.

The nitrogen cycle is well known to every school boy, so I will not dwell on it.

The ultimate efficiency of these cycles is such that no noticeable decrease in the oxygen content of the atmosphere has ever been observed.

So what is the air pollution problem? You know the answer. Air pollution is primarily a localized problem. The concentration of man's activities in urban communities has overloaded the atmospheric sewer at its inlets and built up a wide variety of undesirable effects, even occasionally lethal ones, as witness Donora, the Meuse Valley, and London.

As a consequence, we must avoid these local overloads, which could be done by more judicious distribution of people, automobile, power plants, industrial plants, etc. We won't do it. Apparently everyone in Alberta wants to live in Edmonton or Calgary. The answer, of course, is control at the source. By this I don't mean we should go to a zero emission economy, or to zero population gain, zero motor vehicles, zero combustion and similar zero panaceas sometimes advocated. But we must exercise restraint, in turn guided by prevention of undesirable effects and by economic considerations.

I mention economics, because it is a highly important guide to the good life. Air pollution costs money, but so does air pollution control. So, in my opinion, a cost-benefit balance is a reasonable and worthy measure of the degree of control that lends to optimum enjoyment of life. We may quibble about the details, but we can't quibble about the concept.

Now just a word about the multiple use of resources, which may well be the answer to the air pollution problem. With good conservation practices, an air pollution problem would never have developed!

We are blessed with raw materials that contribute to the good life, but they are not inexhaustible. So we owe it to further generations to conserve them. You are familiar with the need for the recycling (multiple use) of aluminum cans and glass bottles, but this type of conservation must be expanded.

Sulfur is a good example, although you here in Alberta may feel there is a glutted market. The sulfur content of fuels: gas, oil, and coal must be conserved if we are to pass on a desirable economy to future generations. At present we do not have economic methods of recovering sulfur from non-gaseous fuels, but we probably will in the near future and we must do it.

Attention must also be given to conservation of fossil fuels. Nuclear energy offers that opportunity.

At times, however, we run into complex and confusing problems. Witness the current furor concerning removal of lead anti-knock compounds from gasoline. We use 200,000 tons/yr. of lead for that purpose in the United States. But one of the by-products of such removal is an additional requirement for 250,000,000 barrels of crude oil annually. Fortunately we can conserve both by leaving the lead in gasoline and recovering it by use of lead traps in the exhaust system. Despite opinions to the contrary, these are available.

I have given only a few examples of the multiple and proper re-use of our natural resources, which is true conservation.



In closing, I can only say that multiple use of our air environment is a practical way of life, although some restraint must be exercised if we are to guarantee optimum enjoyment of life. One way of exercising restraint is good conservation practice, that is, by multiple and intelligent use of our natural resources.

Dr. W. L. Faith
Air Pollution Consultant
San Marino, California

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Appendix HMULTIPLE USE OF ENVIRONMENT AND RESOURCES - WATER

ADDRESS BY MR. F. A. VOEGE
Ontario Water Resources Commission

It is difficult to know where to begin in making any comments on this subject. There are many aspects that must be considered and to adequately discuss each one would necessitate much more time than I feel should be devoted to one particular viewpoint, especially when an open discussion on this theme is scheduled. I am sure that each one of you has your own ideas on how the environment and its resources should be used.

Although the social aspects of the environmental considerations are very important, I will restrict my remarks to the physical environment, comprised of air, water and soil. Judging from the last meeting that I attended here, I assumed, when I saw the program, that Dr. Faith would speak on the air sector of the environment and that I would not be far wrong if I restricted my remarks to the water sector as much as possible. I think we all realize that the consideration of each sector cannot ignore the others since what is done in relation to one can have profound effects on the others.

The present uses of the water resources in the Canadian environment may vary from providing solely a habitat for aquatic organisms and wildlife to providing a raw material for many diverse types of operations and the carrier of the effluents from them. Where many uses exist some of these may be compatible or they may conflict.

If there is a single use with no deleterious effect caused by that use, and no potential or need for other uses, there should be no problem. Problems arise when the use of the resource by one operation makes it unusable, either due to reduction of quality or quantity, for other operations. When this occurs a sound water management policy is required to resolve these conflicts so that the best use of that waterway can be achieved.

In order to set up a sound water management policy the water management agency requires an understanding or awareness of all the cause and effect relationships that are brought to bear on a water resource. To implement that policy necessitates a great deal of information and data regarding the resource and the activities affecting it. Information must be obtained on its quantity and quality. The various present and future uses must be known or accounted for both from the standpoint of raw water quality and the characteristics of any effluent that may be discharged. The agency may have this data-gathering capability or it may have to obtain certain segments of the information from other sources. In any event, when it has been obtained, the agency should be able to put the policy into practice.

In Ontario, to assist in resolving problems resulting from multiple uses, the Ontario Water Resources Commission has adopted a set of guidelines and criteria for its use in water quality management. These have been prepared in booklet form for the information of the many interested industries, municipalities and persons. Since they indicate the policy that our Commission is following, and concerns the subject matter at hand, I feel you will be interested in them and have included them in my comments. They are as follows:

1. The water resources of Ontario must meet many needs, some of which are in conflict. The standards established, therefore, must be based on the best interests of the people of Ontario. These interests require the preservation, and restoration where necessary, of the quality of our water for the greatest number of uses. The use of water for the assimilation and dilution of treated waste effluents must take into consideration the variety of uses, including public, agricultural and industrial supply, recreation, aesthetic enjoyment and the propagation of fish and wildlife.
2. For each use of water there are certain water quality characteristics, identified as criteria, which should be met to ensure that the water is suitable for that use. (For our purposes, we consider water quality criteria as the numerical or verbal descriptions of the quality of water required for particular uses.)
3. Water quality standards will be established by the Ontario Water Resources Commission for waters of drainage basins or parts thereof with important water uses, following consultation with agencies or persons having an interest or responsibility in the present or future use of the water in the basin for which the standards are to be established. (For our purposes we consider water quality standards as the numerical or verbal description of the quality of water required for a variety of uses in a given drainage system.)
4. Water of a higher quality than that required by the standards will be maintained at that higher quality unless in the public interest an alteration of the quality is consistent with the protection of all uses which are in accordance with the water quality standards established.

There should be a constant effort to improve the quality of water, for it is recognized that the improvement of the quality of water makes it available for more uses.
5. Requirements for effluents and land drainage, based on the applicable water quality standards, or criteria where such standards do not exist, will be established by the Commission in order to maintain acceptable water quality. More stringent methods of control and/or treatment of waste inputs and land drainage may become necessary as the use of water changes or increases, or as standards are re-defined.
6. In establishing effluent requirements from water quality standards a reserve capacity of the receiving water should be set aside to provide an adequate margin of protection in recognition of the limitations of water management theory and practice.
7. All wastes prior to discharge to any receiving watercourse must receive the best practicable treatment or control. Such treatment must be adequate to protect and wherever possible upgrade water quality in the face of population and industrial growth, urbanization and technological change.
8. Criteria and standards of water quality and effluent requirements will be defined quantitatively only where sound numerical information is available; otherwise, they will be described in appropriate detail. They will be re-defined from time to time in the light of new evidence.



In the Water Quality Criteria section of the booklet, sets of numerical and descriptive characteristics are carefully defined. They apply to the major water use categories that were mentioned under the section on guidelines. The criteria are described for use in establishing water quality standards for drainage basins which in turn will be used to determine effluent requirements for discharge of wastes and land drainage.

As was indicated in the guidelines, the implementation of this policy will be geared to serve the best interests of the people of Ontario. It will be based on the best information and data that we can collect and on the views obtained during the consultations mentioned previously. It is extremely important that the public be made aware of the reasons behind the adoption of this policy, the steps being planned for its implementation and be supplied with as much data as possible so that, when its views are sought, they will be given with a sound factual basis.

The implementation will require a great deal of staff work and could be a time-consuming process. However, it is realized that the situation created by the multiple uses of our water resources demands this type of action. The quicker it is implemented, the better chance there is of preserving or restoring it for these very uses.

F. A. Voegel
Ontario Water Resources Commission

Appendix IDISCUSSION ON ADDRESSES ON PRESENTATIONSDURING THE MORNING SESSIONMR. P. E. DUBEY

The first, in regard to the Honourable Mr. Henderson's report, I would certainly like to commend the government very highly on the action that they have taken and Mr. Henderson's Department regarding this Environmental Conservation Authority first, which I think is something that can be effective and also this proposed new Department of Environmental Improvement, which I think - feel has great potential and I have felt for some time that a department of this nature was badly needed, not only in Alberta, but also all over Canada and all over North America and I certainly agree with Mr. Henderson's concept of the multiple use of our natural resources.

I have a question: I would like to ask of Mr. Henderson regarding the Environmental Conservation Authority. Regarding the way that this will function - the areas and its powers and so on. According to what I have heard and what I have gathered from what has been said about this Authority, it will be in effect an advisory body, rather than an enforcement body and perhaps this is a poor way to put it, but I would like to ask Mr. Henderson about this - just what the limits of its authority will be.

MR. J. D. HENDERSON

In the nature whether it's advisory or enforcement?

MR. P. E. DUBEY

Yes. And well perhaps I should stop at the present, but there are one or two other questions I would like to ask while I am here, Mr. Chairman, if I may.

MR. J. D. HENDERSON

Well firstly, you're correct that the Environment Conservation Authority is advisory. As compared to the new Department of Environmental Improvement which is operational and sets criteria, it has some enforcement responsibilities. The reason the Authority is advisory is because the method of business of enforcing the problem is so broad, it runs through quite a number of departments of the government, practically every department of the government has some involvement in environmental enforcement, and of course if we were to give the authority, enforcement powers, they're really going to just start duplicating what a number of departments are doing. There is one other thing, of course, that is, the suggestion has been made in the extreme that we should have some pollution czar that would be the cure-all to do with everything and in that the question of pollution is relative, it is one of multiple utilization, I don't think any democratic system would be prepared to, at least personally and I don't think the politicians would, and I don't think the individual citizen would either really, to delegate absolute executive powers to a body that is completely independent and not accountable to the public and, therefore, the basic question of

policy making and decision making properly, correctly rests with the government, but the purpose of the environmental authority is to examine all these issues, provide a vehicle for public discussion of them, examine what government is doing now, what industry is doing, what they're not doing, and make recommendations, but in the final analysis the government, no matter who they are, have to take the responsibility for those actions and it is the government who is accountable to the public. The authority is advisory, but we think it has one tremendous weapon, that's the matter of publicity, that it will have to make a public report, and table such other reports and opinions as the legislature may order it, and I don't think in our democratic process that any - no obvious merits or recommendations made by the authority that have any merit can be ignored - I just don't think politically you could afford to ignore them in light of public concern over the whole issue.

MR. P. E. DUBEY

Thanks, Mr. Henderson, and I really have no quarrel with your concept of this - how this body will function. I thought perhaps it might be well if it were a body that was completely divorced from politics, you see, and didn't have the restraints of political action - I mean of a political party, you know in regard to action on some sensitive areas of pollution control. I don't know whether you get what I'm driving at or not.

MR. J. D. HENDERSON

Well, there's a lot of mythology about keeping any of these things out of the realm of politics, because that's the way our system works, by democratic debate on the matter. When you have an element of concern - but we're hoping that the authority will concern itself about the technical and qualitative aspects of environment and by virtue of the fact they are not accountable to the public directly, they can make their recommendations independently and as objectively as possible, whether the government accepts them or rejects them is the government's responsibility and the government is accountable to the public for it, but this will leave the authority hopefully as free of political influence as we can get it, but obviously the subject of pollution is in the political realm - I don't care how you care to use the word politics, there's no way you're going to avoid it, but we are hoping the Authority will provide as close as we can get to a non-political public perspective.

MR. P. E. DUBEY

Thanks. Personally I would like to see this body have broader powers.

MR. D. C. WIGHTON

I would like to just make a few comments perhaps about related subjects and one of the prime reasons for our present environmental problems is of course the population explosion, and I would like to make a few comments on this and then drift down to the theme of this conference if I may.

The population problem is being described by an increasing portion of the world's foremost citizens as the most complex and important problem that mankind has ever faced. In Canada the dangers are deterioration within as well as the population pressures elsewhere. The grave lack of knowledge-ability, courage, leadership and responsibility on the part of most Canadian

politicians in all levels of government threatens not only the level of living for our grandchildren, but the very survival. Since politicians are the reflection of the people they represent, I think citizens in all walks of Canadian life, including groups such as this, are almost guilty of a serious lack of initiative, leadership, responsibility and action on the population problem.

The foregoing argument then may sound like an unreasonable alarmist point of view, but I contend such opinions are reasonable because the present rate of world population growth and its implications for the next few decades are generally difficult to comprehend. I could give you fine examples of this, but I am not going into this, but I would like to tackle the theme for this conference and that is the multiple use of resources and the way I see it that they are - the wilderness areas that is - they appear to me that they are a museum of natural plant and animal communities, besides satisfying man's yearnings for beauty and recreation, they perform this indispensable role in his welfare, while there is a part of man's recent past and essential to his future, the biological rhythms of modern man which shape his life are often tied to the natural forces beyond his urban surroundings. These natural areas should be protected and saved by the government. They are, if you will Mr. Henderson, the first stage green belt where limits are placed on population and economic growth must begin, since all types of growth cannot continue on a fenet planet. We have to realize and prepare for this. I don't think we have the moral right to dig up all our reserves in the next ten years. Surely our economic system can be revised to deal with future generations' needs and this is completely related to the population problem which I was trying to get across, because this alters your figures - for the limits which our resources can stand.

MR. H. LEMBICZ

I understand they will have no powers of enforcement. The Authority will have to educate that government to get the support of their recommendations which might be altogether too slow and if they haven't got the public support behind them they might just be a voice in the wilderness.

Another comment I would like to make in regards to what my thoughts are on multiple use. This is a nice phrase and it really is a good catch phrase for political men. They use it to quite an advantage and I think the public as a whole gets carried away by the multiple use and the reason it's a good political theme is because it gives everybody something, when planning the use of an area and this is where we get into our problems. Every area should be determined, I strongly believe that every area has a use and it should be - the use of that area should be determined - any use from that area must complement each other or you're into deep trouble. I think that is where we find a lot of our problems now - is that we try to make too many uses out of different areas and different rivers and lakes, and so forth. Going into the subject of river, this multiple use of that river has in the past given us the idea that, the filthy ideas I should say, that we can use that river to greater extent than we should. This is what has given us the habit - some of our filthy habits. Actually when we're talking about pollution it simply means that we must never forget that the pollution problem got there by the filthy habits of mankind - we should never forget that part. The question I wanted to ask Dr. Faith - remark that oxygen content in the air is not changed according to the measurements and yet there is quite a few qualified men have written that the oxygen and supply are going down

because of the loss of algae in plant life in the oceans. Is this really true, are we losing some of our oxygen by loss of plant life?

DR. W. L. FAITH

We probably are losing some oxygen from one source or another I suppose, but the latest measurements that have been made, and that have been evaluated by one of the departments in Washington, and these are very, very careful measurements, and they can find over a period of years no change in the oxygen content down to I think it's the fourth decimal place of the percentage. The point of it is that those who have been worrying about the depletion of oxygen in the atmosphere have done this on a theoretical basis but when you get right down to the experimental basis, it hasn't shown up. The only real change in atmosphere that we can find is a slight increase in carbon dioxide, but none in oxygen.

MR. J. R. McFALL

This is just a question of clarification. Mr. Dobko referred to the Oil and Gas Conservation Board as having certain responsibilities with regard to air pollution. Now did that include air pollution generally, or did it just include the air pollution related to oil development and so on.

MR. S. L. DOBKO

In answer to that question the particular jurisdiction of the Oil and Gas Conservation Board is related to the exploration production of oil and gas in the province and it's strictly to do with that particular phase of operation. The rest of the air pollution control is under our jurisdiction.

PROFESSOR P. LEWIS

I would like to make a couple of comments and then ask the speakers a question with respect to multiple use concept. The two areas that are represented as the principal interest of the speakers are air and water. In both these cases we seem to have a defacto multiple use that is going on all the time, simply because air and water are both very mobile and move through the environment and tend to be renewable - they renew themselves as a result of natural processes. There are other resources, however, which are essentially non-renewable and in this regard I would like to ask your comments, although these are I grant you out of your specific fields of interest, I would like to ask your comments about the multiple use concept with respect to the development and utilization of non-renewable resources and to ask you also if you make the differentiation between multiple use and the concept of sequential single use.

MR. F. A. VOEGE

Now as I mentioned before, my field is water resources and I think it's a little dangerous to stray too far, unless one has some outside experience in this field, but I think that as far as multiple use is concerned, my remarks were directed to, if it is in the best interests of the people of Ontario, now this doesn't say that multiple use will be something that will occur. It may occur, but there is still going to be a great deal of examination on whether this is a good thing or whether it is a viable thing as far as the resource is concerned. As far as the non-renewable resources are concerned, I find it difficult to comment on this. I think that the idea is to

make use of them more wisely, if this can be done, than, considering that they can't be renewed.

DR. W. L. FAITH

Well I thought I had commented to some extent on this in the remarks that I had made as to the need for the conservation of non-renewable resources, and in this situation why there are fossil fuels is a good example, sulphur is a good example. And these we do have to put a lot of thought to spreading the use of these out over a long period of time. No one knows how long this earth is going to last, this life is going to last, so that probably there will be some end to their use, which we have to have alternative sources which are similar to that, but I think there can be no doubt that we have to wisely use our resources, we have to plan, as Mr. Henderson mentioned, this business of land use is one of those things that is going to require continual planning ahead and I think the use of fossil fuels is another one. There may be some uses for which we do not have at the present time a suitable alternative, then we should use it for this. I don't know too much about the situation here in Alberta and I may be dismayed - some of you may not agree with this, but I have always looked on the situation in the United States for instance with respect to the use of fossil fuels, that for instance we do know there is a limited supply of natural gas and in those communities where they are blessed with large quantities of coal and things like that there is some doubt as to whether the highest priority use of natural gas is in a power plant, although up here you have an entirely different situation. However, down there we think perhaps that one of the highest priorities for the use of natural gas is in the heating of homes, because these people can't do anything else as a rule to cut the pollution from their use of fossil fuels, whereas a large power plant can use coal and we believe that in a very short time will be able to cut the pollution down to zero, so I don't disagree with the gentleman who asked the question. I think that we do have to look very carefully at our non-renewable resources, but that doesn't mean that we don't use them at all. I can't go for this zero business.

MR. J. D. HENDERSON

The question is almost impossible to discuss in absolute terms, because it is a relevant one as far as non-renewable resources are concerned and certainly there are two extremes, concerns, I recall as a youngster going to school here and hearing about the Mesabi Iron Range with its inexhaustible supplies and yet they went through in the second world war their high grade ore and now they're down on their lower grade. And so obviously with the technology man has he has a tremendous capability to develop and utilize resources and possibly squander them. On the other end of the argument there is - the planner likes to think in terms of planning and he is thinking in terms of planning that is something like 2-300 years planning and this is almost impossible for a man with a life span of 60-70 years to grasp. I think what will actually happen, of course, is that the system is counterbalancing itself. The prognosticators of three people per square foot of earth of course it is only a mathematician would stand up and make such a statement because it will just never happen and society is getting so complex that some of the problems are getting so - literally people are looking to government for literally insoluble, because it is the attitude of the individual himself lies at the root of it. If one could turn around and have a complete inventory of all resources and sat down and computerized, work out a thousand year program, but it really wouldn't be worth the paper it's

written on in practical terms, it's contrary to the basic nature of man to say that he shouldn't chop wood to burn to keep his house warm, or mine coal to generate power, or develop oil resources to run his automobile. I can't see any other final discussion except a philosophical one. If one suggested that man should not do those things, well, of course, man basically suggests he should be an animal like any other animal and live by the whims of nature and makes no effort to control them, so philosophically the suggestion that we don't use resources, of course, is just basically contrary to the nature of a human being. But there are some very obvious concerns, I agree with you, in the rate at which some of these resources are being squandered, but I think the concerns of the environment and the checks that are going to be placed on them - requirements on pollution control - are going to reduce the availability and increase the prices of some of these products to the point that this in itself will reduce the consumption of them. This seems to be almost inevitable - so that I think you will see that if we don't completely poison the environment for human life itself, that a lot of these problems that the prognosticators come up with - three people per square foot and squandering all these resources - I think the social consequences of them are going to build checks into them. I have a theory myself that says one of the problems we have today, socially, is basically the result of the fact that technology is changing so fast, and it's basically aimed and based on resource utilization that society has reached a point - beyond the saturation point of its inability to absorb those changes, and you see all sorts of revolts building up, in all elements of society about the continued rate of pace. I think you're going to see a slow-down or a levelling off in the rate of technological change because if - the social consequences continue at the present rate - to which is tied resource utilization - are just going to be simply catastrophic if they don't but that's the philosophical point but I don't know in the final analysis how else you can approach it than on a philosophical basis.

MR. W. BANNISTER

I'm going to be a bad chairman and interject my own opinion here. This is an area I feel very strongly about but by profession as a mining engineer which wouldn't surprise me if somebody threw something at me perhaps, but it is very easy to sit and philosophize here in Edmonton, but I have been on the mining frontier a number of times, a number of years I have watched these various areas evolve, and I would strongly recommend to any of you here in the room today I have studied the Alberta Historical Review over the years and I think Professor Lewis brought up a very significant term when he said sequential use of resources. Mr. Henderson identified the fact that our foothill country is some of the loveliest country on earth, but how do we know that. We know it because it is accessible and if you read the Alberta Historical Review or any historical treatise on the province you will find that the access to those areas is a linking together of road systems that were put in there on these resource industries. The coal mining in the early days, the forestry trunk road, all that is a linking of places that were in the early coal mining era, from Hinton to Robb to Foothills to Nordegg and right on down to Kannanaskis. The coal mining that was done there, there were degrees of irresponsibility in it, we should learn from these mistakes and use the resources and not abuse them, but time after time I have gone into areas, we've developed a mine and we never had anybody come in to visit, then as you derive your own logistical support, whether it's rail, or highway, or whatnot, landing strip, then you start getting deluged with people who want to use your access roads and eventually they become public domain. But on the other hand, if they then want to take over the whole thing to the exclusion

of an existing operation, then it becomes highly questionable because I don't think any government has the resources to push say the road system that we have in our foothills strictly for the recreational value and let's face it, 99% of the people who come down those road systems don't go very far away from their automobiles. They like to think that they are back to nature, but they don't go over the next ridge. We happened to be running a limestone quarry down there in the coal branch and I have yet to find any person beyond that first ridge - we have an easy access up there and we can look over - I don't go up just to look, but generally they work from the access roads, which is fine, there is a tremendous network and you need special vehicles to get in there for the hunting and the fishing and I strongly feel that this has not been a bad development and what we should do is make sure that it is developed in an orderly way, this term sequential development is excellent I think because it is a non-renewable resource that we are faced with, but if it is done properly it does not need to intrude on the rest of it. I apologize for stating my own opinion.

MR. ART WIGMORE

I would like to direct a question to Dr. Faith. He has mentioned that they have been doing monitoring of the atmosphere, which moves freely about the globe, and so you can get a good assessment of what is going on. One of the basic things to our environment on the earth is the oceans and we understand that the oceans are slowly being polluted. Has there been constant monitoring of the oceans to see what is going on? Has there been any effort internationally to set up criteria for the oceans?

DR. W. L. FAITH

There has been some limited monitoring of the oceans, but certainly it has been very inadequate. There are I understand now - the World Health Organization, or some similar organization like this is thinking very seriously of setting up a global system of monitoring the oceans. It certainly should be done but it hasn't been done to much extent so far. Even with this business of measuring the air, the oxygen in the air, there haven't been a great many of those either. It just happens that the few that were made look like they were done properly, but there are so many things in the ocean and the ocean is so vast and the only thing I can say is I would hope that there would be more monitoring of the oceans in the future.

MR. F. A. VOEGE

I would second Dr. Faith's comments on this, just an additional comment to the fact that in many cases the water resources of large bodies of water have been considered in many cases inexhaustible or unpollutable and this has particularly happened in our area, around the Great Lakes and it is just within the last two years or three years that the exhaustive study or a great deal of study has been put into the Great Lakes and I feel that this will come in the oceans, especially where they have an immediate impact on the people living along the shores, so I think it is bound to come and when it does come it will be an international effort and much will come from it, but as far as I can say right now I have no idea what the program will be or what the scope will be.

MR. W. J. YURKO

I'm a politician; sometimes I think I'm a consultant to politicians, particularly reluctant ones. My comments are going to be with respect to the future role of the committee as I have heard something today that has disturbed me just a little bit and I want to put in a plea to the Minister to possibly reconsider his decision with respect to this matter of the future role of the committee. He indicated that consideration was being given to putting the committee under the Environmental Conservation Authority, so that the committee may be made non-political or they may function as a non-political organization and I find this somewhat disturbing in that I think we all recognize as the Minister has just indicated a few minutes ago, that pollution is political - there are no two ways about it. I have myself been on three subcommittees and I want to indicate that I have certainly enjoyed the discussions that went on and it is impossible to separate technical aspects from political aspects and I look upon the committee as a committee who applies pressure upon the politicians to take certain directions and in fact I look upon the committee as a hot seat for the Minister himself and this relationship between this committee and the Minister is a very unique one and one that certainly impressed me very much when I understood that this committee was in fact set up some years ago and it is called the Advisory Committee to the Minister. I would like to see it retain this role, as an Advisory Committee to the Minister. The Environmental Conservation Authority does not report to the Minister, it reports to the Executive Council. It is concerned, from my understanding of the Conservation Authority, with long-term orientation, long-term problems. The committee in my understanding of the committee is primarily concerned with short term problems that are here today and now and is a committee applying pressure and information and guidance along technical as well as political lines. I was very much impressed by some of the recommendations that were made in the last couple of years, for example Mr. Manyuk's recommendation which in fact resulted in the Environmental Conservation Authority. This was a political recommendation. Also I happen to know that recommendations were made with respect to setting up a new Department of Environmental Control or Environmental Improvement at several times during the deliberations on subcommittees, so I just want to indicate again that from a personal standpoint I would make a plea to the Minister to reconsider again the role of this Advisory Committee and retain it as a monitoring force on the necessity of adequate political action.

MR. J. D. HENDERSON

Well, I have to acknowledge the fact that Mr. Yurko's remarks have a lot of meat in them and the government isn't making a decision on the committee; I think this a subject that the committee itself should take under advisement and decide. One reason for suggesting that it be advisory to the authority is the fact that I have had questions and comments have come up and said well you know advisory committee is just another body for an excuse to help the government do nothing - that is the frame of mind - general sentiment that was expressed to me about the functions and purpose and usefulness of this meeting and our only concern is - and my only concern - is in retaining the useful contribution that this committee can make and to utilize the talent that is on it to the best possible public advantage and if one of the ways of making it apparent that it isn't just an excuse for the government doing nothing because it has an advisory committee that recommends do or don't do something - it seemed to me one of the best ways of countering this attitude in order to look to the future in a long term continuity usefulness of the committee was to attach it to the authority which we hope would be a little

bit farther removed from the political arena, and I'm talking about the partisan political arena. Now there is certainly something to be said for having it instead of advisory in the future it has been advisory to the Minister of Health, have it advisory to the Minister of the new department, Environmental Improvement and this is quite feasible and I think the committee members themselves should give some thought to which is the best way that they can make their contribution. When looking at the job of the Authority, the Authority's main job basically is looking ahead, but of course in the process of looking ahead it can't divorce itself from the problems that exist today and when one gets into tackling a problem such as this and trying to figure out the administrative structure and sort of philosophical basis on which to utilize all the talents we have available it poses a number of problems and a number of compromises and I just want to point this out on the question of the Authority itself which is really one of the questions we are talking about I think, not just the committee but the role and function of the Authority and you have to appreciate that there are three basic areas we are talking about. There is the first one - question of policy, second one of program and another one of enforcement. Now for those who have their mind made up in one direction that one thing is the answer and there are no compromises on it, and governments have to confess a predisposition towards the concerns of people and the concerns of fish and muskrat come secondary, but if anybody is predisposed towards saying the concerns of people are secondary to fish and muskrats, well naturally they would then favor taking a body and setting up and giving it policy making powers, independent of public opinion because public opinion is concerned about people and they want to give it powers to formulate programs and powers to enforce it and naturally I don't think you would find such a body would be acceptable to the public, like it or not we're biased in favor of human beings and I think I would be surprised if there were an individual who felt down deep otherwise and so in our political system I find from my association in the political arena and in government I feel very strongly about keeping responsibility for formulation of public policy in the public political arena just as Mr. Yurko says because these are the people who are responsible to the public or accountable. It isn't the civil servants or the administrators, it's the politicians - this is what you're elected for to formulate policy and I don't agree in principal with having a single body setup to formulate policy independent of public opinion, because a good example - use the Board of Public Utilities - was set up some years ago for a variety of reasons and the government referred the matter of milk pricing or milk supply to the Board of Public Utilities to stabilize the supply and of course it is still doing the job, but now the complaints come in from the producers that the Board is insensitive to his demands and of course the Board is an entity unto itself and is not subject to direct government direction, so when you set up a body that has complete jurisdiction to formulate policy, to develop programs and enforce them and say that they are not going to be accountable to the public, this is simply contrary to our basic democratic process and it just cannot work, so the idea of the Authority was to clearly establish a body that is going to provide a perspective, clearly in the realm of policy, that they remove from the civil servant, they're removed also from the politician, but they are accessible to everyone, the individual citizen, the politician and the expert in the various vested interest groups that would clearly be concerned about policy and looking ahead and while the concept is intangible, when you get down to running a large corporation such as government, with 15,000 employees in it, trying to meet the needs of a million and a half people, obviously there are some tremendous compromises and independent bodies, no matter how capable they are, have a natural tendency, it is only a matter of when, 'til they become

bound up in their own prejudices, because they formulated the policy, they developed the program and they are enforcing it, they become God, accountable to no one. And so it was this thinking that said we want an independent body that is not tied to bureaucracy, that it is not directly responsible to the politicians, and the authority could be responsible to the legislature and this is maybe where it should be responsible to make this quite plain instead of the Executive Council, but it is a compromise in which to try to deal with the total problems that we have to face. Coming back to Mr. Yurko's remarks, I think it's a question that the committee members themselves should take in hand, whether they think that - I don't believe myself in making the committee as responsible to the Authority, that it is removing itself from day-to-day problems, because the terms of reference, the commission include immediate day-to-day problems, and to formulate policy they have to start from today's problems, so it isn't going to be removed from today, but there is certainly merit in both sides and the government has not made a decision because our main concern is to have available to the public, through the government, through the Authority, whichever way you want to do it, the capabilities, the talents and the interests that are represented in a group such as this and certainly as Mr. Yurko says a body such as this does provide an opportunity to put the Minister who is politically responsible to the public on the hot seat and this is fine, I don't disagree with this concept at all, it's how our system functions. But think about it over the next two days and this evening at the meeting of the chairman of the committee we wanted to go into it further at that time and I hope that before the discussions are finished tomorrow that there will be an opportunity to discuss this question further. In the meantime I just suggest we shelve it, let everybody think about it and judge the pros and cons in the light of the discussions in the next two days and then make a recommendation. As far as the government is concerned, we have not got a firm conviction on the thing one way or the other, but we did think if this thing is getting identified as just a group of citizens the government gets together as a political group, and using it as an excuse for not tackling pollution problems aggressively - and this of course is completely contrary to what the whole purpose of the committee was for, but this is the feedback I get from certain areas of the public. So think about it.

PROFESSOR J. R. NURSALL

I understand the name of the new department will be Environmental Improvement. This has been tentatively suggested. This suggestion, quite frankly, sir, makes me a bit nervous. Really when I consider it more it terrifies me. For this reason, sir. The environment in the natural state is the result of about three billion years of practice and evolution and development. It has withstood a variety of exigencies, and forces perhaps even beyond those we can bring to bear today, although we are pretty good at applying malevolent forces. The thing I think we must clearly distinguish here is that there are two kinds of environment we have. We are still able to preserve some natural areas, most of the areas we are working with are no longer areas that can be said to be in a natural state. These we have manipulated, these we have worked, these we must continue to manipulate and indeed for our own benefit to improve. But I would submit that the matter of a natural area, and this is the sort of thing that is very often called wilderness, is mutually exclusive to exploitation of any sort. Once there is a kind of exploitation, then there is no longer a natural environment. What I want to suggest is there is a necessity for natural environments and not simply as a place where muskrats can thrive, or birds can sing, or hikers can wander, to enjoy, I am not arguing that these are the reasons for preserving wilderness or natural areas, because I think this is misleading.

The reason for preserving natural areas, and as large natural areas as possible, is to provide places which act as reservoirs to enable natural phenomena of the type Dr. Faith for instance talked about, to continue to operate successfully, that is where there will be an indescribably complex interrelationship of biological, mineralogical, geological, geographic factors providing a relatively stable complex into which excess materials can sink and out of which new materials can be brought by natural processes into the circulation of the atmosphere, the circulation of our waters and so on and so forth. One can exemplify this in a way by taking an example of a place such as Ghana, the state of Ghana in Africa is underdeveloped industrially, it's a place we think of as being in jungle, natural undisturbed conditions, but it holds a fairly large population of people. Now in Ghana they are attempting to establish natural areas, national parks, reserves, preservations. The reason for this is as follows: even undeveloped as such a place as Ghana is the population pressure on its resources, limitless as they seem, are such that this whole part of West Africa exemplified by Ghana suffers from an endemic protein shortage. This was seen very clearly in the Biafaran episode. This became epidemic, but at the best of times there is a protein shortage there. This is simply because there are enough people to have removed most of the sources of protein, simply by their daily existence. The purpose of establishing reserves for instance is to enable there to be a natural area for natural reproduction of the kinds of animals which would then be allowed to move out of the reserve to be available to the population as a source of protein. Now I am not suggesting for an instant that we have to establish places where moose can be raised and then released so we can all have moose for protein. I am merely trying to use this as an analogy to suggest that we need protected, undisturbed areas, from which all sorts of components, many of which we cannot even describe yet, are necessary for our own successful survival. This then I think is the basis of my nervousness, over the title environmental improvement. I think for one thing it is a bit presumptuous for us to think of being able to improve all environments for our own purposes. I think it is real in the case of the unnatural environments. The places where I have worked in Alberta, for instance on the North Saskatchewan River at Lake Wabamun, these are no longer in a pristine sense natural environments, they are highly modified environments, we must work on them to improve them, to make use of them, multiply if necessary. We must maintain environments unused for long periods of time. Perhaps in a hundred years we will have to reassess, but I think our present objective should be to maintain as large natural safety factor reservoirs for ourselves and for the generations following us.

MR. J. D. HENDERSON

Maybe I could just comment on the selection of the name "Improvement". The gentleman who just spoke is looking, examining the word "Improvement" relative to his definition of "environment" and he wants one in terms of untried by man, so man can't improve upon. The question of the name is really somewhat incidental to the job the department has to do and quite frankly the name, long before we announced it, was under discussion whether it should be "Environmental Management"; we didn't want to confuse it with the Conservation Authority, putting Environment Conservation on there and I think the word is basically aimed at the average citizen improving the environment, not only the one he is living in but the one he wants to play in and so on and if there isn't need for improvement, then obviously all the concern about pollution is pretty unreal, but it was because of the concern over pollution we wanted to improve it, that the word

was produced so this is the context in the word improvement was really used. I don't think that anyone is suggesting that we are trying to replace nature with man-made improvements on nature's capabilities, but I think maybe to improve some of the ravages that society has inflicted upon nature and this is really the choice of the word, but I am not stuck on the word "Improvement". It does raise the question you brought up and when it gets down to the name of any department, I am more concerned about as I say - I don't care what you call the horse as long as it is winning races. I think the name, therefore, is really secondary to the job it has to do and one has this problem in any department when you set it up.

DR. W. L. FAITH

No, I don't think I have anything very much to add to it. I think the one thing I got out of it, the one thing I wrote down, his comments indicate that this is a very complex problem. This whole problem of the environment. There are no simple answers and that reminds me of a statement I read the other day that was attributed to H. L. Menken who was an American journalist and author in 1920's. He was quite a cynic but I think that this one statement that he made fits this whole environmental problem so well that I remembered it. He said: There is a solution to every problem, simple, neat and wrong.

MR. F. A. VOEGE

I think in many cases the ability of this wilderness area to provide this reservoir depends on the particular area we are talking about because they all vary in their actual scope and what can be done in that particular area, and certain areas I think in Alberta here, and I am speaking as a person from Ontario with a minimum of knowledge about it, but Dr. Nursall mentioned that the transfer of organisms from the wilderness area to outside the area, this may be the case in that particular area, but in other cases it may not be the situation, where what happens in the wilderness area pretty well stays there as far as the organisms living there - they have to be sort of enjoyed and whether they spread any further than that is open to question.

MR. P. E. DUBEY

Mr. Chairman, I have a number of technical questions I suppose you are going to limit me to one and if you are I would like to direct this to Mr. Briggs. It's a sort of change in atmosphere - from what we have been discussing. In these sewage treatment plants, especially secondary treatment plants, provision is made for the recycling of nutrients. We hear a lot about the damage nutrients are doing as far as alga growth, population explosion of alga in the waterways and I am just wondering a bit about this because the nutrients originally I believe in these plants are siphoned off to a lagoon, but provision is made to recycle the nutrients and it doesn't seem desirable to me and I was wondering about this, I would like Mr. Briggs' comments on that.

MR. R. N. BRIGGS

Actually there is no definite attempt made in the secondary type of sewage treatment plant to recirculate nutrients. Care is given to the use or where the nutrients occur. For example in the sludge the nutrients are normally concentrated by digesting of the sludge and lagooning and perhaps reuse of the sludge as fertilizer or soil nutrients on land, the nutrients are recycled back to the environment. In sewage lagoons the nutrients are basically removed, providing there is sufficient retention. In the province there is no plant especially designed to remove nutrients as such. When they occur and how they are disposed of is definitely considered.

MR. R. F. COMSTOCK

I would just like to comment on an aspect which I don't think has been mentioned, although I think it underlies a good deal of our problems in pollution these days and that is the matter of education. I think we have a subcommittee on this aspect, which I hope to have the opportunity of hearing tomorrow, but education starts in the schools and I would like to compliment the Department of Health who put out this particular brochure earlier in the year. I think it is an excellent one. It gives a lot of good information and I would just like to ask the question as to whether or not booklets were provided in any way to any of the schools in Alberta.

MR. H. L. HOGGE

Yes, we did try to distribute the booklets to all of the schools. We worked through the Department of Education and there was something like 7,000 copies that were distributed to the schools, the number varied with the size of the school. Say there were 20 teachers - I believe it worked down to about 5 booklets for the school. So that there were 7,000 distributed to the schools, both the elementary, the junior high, and the senior high.

Appendix JREPORT OF TECHNICAL SUBCOMMITTEE NO. 8AIR POLLUTIONCALGARY

Since the October 1969 meeting of the Alberta Provincial Advisory Committee in Edmonton, there has been one meeting of the Subcommittee on Air Pollution Control - Calgary. The Subcommittee convened on June 25, 1970 in #1 Committee Room, Calgary City Hall. There were seven Subcommittee members in attendance.

The minutes of the Subcommittee meeting of June 1969 were adopted as distributed. No business arose out of the minutes of the last meeting.

Mr. Dobko, who had just returned from a National Air Pollution Conference in Eastern Canada, informed the Subcommittee that the Federal Government Department of Transport Safety Division was drafting exhaust gas emission standards to which the 1971 Canadian manufactured and imported automobiles would be required to meet. It was stated that the standards would parallel the emission standards set by the United States and the Province of Ontario.

Mrs. Davidson brought to the attention of the meeting that an Ontario Company called Pollution City Devices, Toronto, were advertising on the radio a new anti-pollution device for attachment to the carburetor to control carbon monoxide emissions on all makes of cars. It was suggested by Dr. Havlena that further information on this device be obtained from the manufacturers and that one be purchased and subjected to testing by the Chemical Engineering Department of the University of Calgary. A letter was written to the Company with this objective in view, but the Company has not seen fit to reply to my correspondence.

The Committee next examined the Annual Air Pollution Summary for the City of Calgary for the year 1969 as compiled by the Air Pollution Division of the Provincial Health Department.

It was noted that total dustfall yearly average of the eleven stations was recorded as 17.21 tons/sq. mile, slightly lower than the figure of 17.72 tons/sq. mile in the previous year. Although dustfall readings remain fairly constant over the years at ten of the eleven stations, the readings yearly average of 39.51 tons/sq. mile in a 30-day period at the No. 1 station at the City Hall is excessively high. Considering it is in the midst of the downtown commercial area, it is difficult to explain why this station should be recording values sometimes two and three times as great as the highest reading obtained in any of the other stations. It was felt by different members of the Committee that downtown construction, open areas in new developments and frequent street sanding along the major thoroughfares might be contributing factors to the high readings.

It was moved by Mr. Comstock and seconded by Mrs. Davidson that a recommendation be made to request the Research Committee and the Alberta Research Council to investigate the possibility of sampling and analyzing dust

samples obtained from high traffic density areas to see if asbestos fibres and silica constitute a significant health hazard in City road dusts. This recommendation so put on record.

The levels for Hydrogen Sulphide measured as SO_3 equivalent mg./day/100 sq. cm. showed an overall mean reading of 0.055 mg./day/100 sq. cm. in 1969, a reduction from the previous year when the yearly average reading was 0.063 mg./day/100 sq. cm. Recording station No. 5 in the industrial area has always recorded the highest readings. During the month of February 1970, one of the Provincial Government Mobile Pollution recording vehicles equipped with a twenty-four hour H_2S analyzer recorded was stationed in this area but failed to record any significant readings of this pollutant gas.

The total sulphation readings at the eleven stations gave a mean reading of 0.376 SO_3 equivalent mg./day/100 sq. cm. This is the highest reading recorded in the past five years and is up 26% over the 1968 average reading recorded as 0.272 mg./day/100 sq. cm. All the eleven stations exhibited an increase in total sulphation when compared to the corresponding values of 1968. The Provincial Government Mobile Unit continuous monitor, referred to above, was employed to measure SO_2 levels at the same location during the month of February 1970 over the twenty-four hour time span. Again, no significant SO_2 readings were recorded in the Bonnybrook area during the entire month.

The readings for H_2S and total sulphation recorded at the respective sites of the monitoring stations within the built-up area of the City have been regarded as unusually high over the years.

No major processes or specific conditions are considered to exist within the built-up area of the City proper to be responsible for significant generation of these two pollutants.

Three relatively isolated sites, in the North (the Airport Control Tower), in the West (the Baker Memorial T.B. Sanatorium) and in the South (the Lacombe Home), were selected for establishing additional monitoring stations for H_2S and total sulphation values. It was hypothesized that significant levels of these pollutants might be entering the City air on the prevailing winds from Gas Processing Plants many miles distant, yet up-wind of these locations. It is interesting to note the values for H_2S and total sulphation recorded at these remote sites and compare them with the monthly mean readings of these same pollutants recorded at the established monitoring stations throughout the City over the past eight months.

Month	H_2S Average Perimeter Readings	Average H_2S City Stations	Sulphation Peri- meter Stations	Average Sulphation City Stations
Dec. 69	0.018	0.058	0.126	0.328
Jan. 70	0.030	0.045	0.421	0.409
Feb. 70	0.010	0.048	0.209	0.288
Mar. 70	0.015	0.036	0.133	0.243
Apr. 70	0.020	0.030	0.239	0.286
May 70	0.012	0.019	0.137	0.234
June 70	0.002	0.028	0.065	0.203
July 70	0.001	0.017	0.125	0.278
Average	0.013	0.035	0.182	0.284

In summary, the readings obtained in the perimeter stations for H_2S is 37% of that recorded within the City and total sulphation at the perimeter stations is 64% of the level obtained at the monitoring stations scattered throughout the City over the eight-month period. It will be informative to relate these figures for the entire year to the hours of wind occurrence from the north, south and west in due course.

Fluoride levels recorded during 1969 showed an average over the year of 0.0067 mg. of fluoride per 100 sq. cm. of filter paper per 30-days exposure time. The values ranged from a low of zero to a high of 0.030 mg. of fluoride. There was a marginal increase in the yearly average over the 1968 values when the yearly average was 0.0065 mg. fluoride. The readings for fluoride present no health danger at this time.

The average suspended particulate matter soiling index reading for the year of the four recording stations was 0.236 C.O.H. units, marginally up over the previous year when the over-all average was 0.225 C.O.H. units.

The mean hourly suspended particulate matter soiling index readings were:

Station #1 at the downtown location of City Hall	1969 - 0.432 C.O.H. units 1968 - 0.311 C.O.H. units
Station #2 Alberta Government Telephone Building S.E. Industrial Area	1969 - 0.170 C.O.H. units 1968 - 0.275 C.O.H. units
Station #3 Waterworks Plant, Residential Area	1969 - 0.148 C.O.H. units 1968 - 0.101 C.O.H. units
Station #4 North Hill Shopping Centre Commercial-Residential Area	1969 - 0.195 C.O.H. units 1968 - 0.210 C.O.H. units

The yearly average peak readings recorded during 1969 were:

	<u>1968 Corresponding Figures</u>
Station #1 - 2.400 C.O.H. units	3.700 C.O.H. units
Station #2 - 1.200 C.O.H. units	4.800 C.O.H. units
Station #3 - 1.100 C.O.H. units	1.300 C.O.H. units
Station #4 - 1.300 C.O.H. units	3.200 C.O.H. units

The total abandonment of open burning of domestic refuse in backyard incinerators has had its predicted beneficial effect on one aspect of the City air quality.

Suspended particulate matter, expressed as micrograms per cubic meter of air measured by the high volume sampler, recorded a random daily average of 131.0 micrograms per cubic meter of air. This is significantly above the figure of 110.6 micrograms per cubic meter recorded in 1968. There was considerable discussion on the possible causes for this high reading of suspended particulate matter. Inadequate street cleaning, dust generation from major construction sites, the stripping of top soil from large areas in

the laying out of housing subdivisions in the new suburbs, gravelled roads in many outlying districts and unpaved back lanes were major factors cited for the high readings. The stripping and stockpiling of loam from large tracts of land in the development of housing subdivisions, leaving exposed friable clay and till material to be graded and eventually built on, yields dust and particulate materials for dispersion into the atmosphere during moderate to heavy wind conditions. Although this creates dust conditions of a localized nature, its general influence may well be greater than realized. Subdivision land stripping may not be undertaken without permits being issued and detailed plans presented showing the area to be worked and the grades to be met. The onus of dust control is the responsibility of the development company. No recommendations were made as to how this problem may be further controlled.

Total oxides of nitrogen and nitrogen dioxide began to be on continuous instantaneous recording in August 1969 by an instrument located at the #1 station at the City Hall. Data covering only four months was available for review. It was noted that the monthly mean readings for NO_2 were below the arbitrarily chosen base of 0.025 p.p.m.

Total oxidant expressed as parts per million of ozone on the mean year basis was 0.850 p.p.h.m., up just over 50% on the 1968 annual average reading of 0.555 p.p.h.m. During July and August mean readings of 1.018 and 1.234 p.p.h.m. were recorded. These readings, though rising, are still a long way from the maximum readings recommended for the air quality standards.

The Committee reviewed in detail the locations of all the existing monitoring stations in regard to their numbers and placement throughout the City total area. It was considered that a more balanced distribution should be in operation to determine the levels of pollutants occurring in typical residential, commercial and industrial districts. In this way more representative average readings of air quality conditions would be accumulated which in turn would provide a more meaningful average of the overall air quality state of City air. It was agreed that a single specialized recording machine in one fixed location monitoring the total nitrogen gas pollutants or the total oxidant levels provides very biased data readings which may be very unrepresentative of the actual average conditions to which citizens are exposed prevailing within the City. These machines were placed in a downtown location to monitor data obtained under known unfavourable conditions. Additional recording stations within a typical residential setting can be justified.

It was moved by Mrs. Davidson and unanimously agreed by the Subcommittee that a recommendation be placed before the annual general meeting in November to the effect that:

Whereas data providing total oxides of nitrogen, nitrogen dioxide and total oxidants is presently being recorded only at a single downtown location, it is recommended that

- (1) A duplicate set of such instruments be purchased by the Provincial Government and placed into operation at a location in a carefully selected typical residential area.
- (2) That suitable equipment to provide continuous monitoring of levels of carbon monoxide and total hydrocarbons be purchased and installed at two selected locations to provide data on the levels of these pollutants in the City of Calgary.

These resolutions are so put on record.

The Committee reviewed proposals for a pamphlet designed to inform the individual of his responsibilities in combatting environmental pollution. The draft and format had been mailed to all members prior to the meeting. It was agreed that the ideas behind the draft were excellent. However, it would be more effective if it were reviewed and divided up into various aspects of pollution that every individual must observe and follow. It was agreed that the subject matter covered would be more effective if broken down into three or four separate pamphlets with each having its own specific topic. A small subcommittee should undertake to redraft the material and that it should be presented to the Subcommittee on Information & Education for assessment to form the basis for a series of informational pamphlets. This material is now in revised form and will be submitted to the Education & Information Committee for attention.

The subcommittee reviewed the measures passed by the City of Montreal in March 1970 to control air pollution by prohibiting buses, trucks, taxis and private vehicles to exceed a period beyond four minutes of the engine "idling" when parked during the course of business. The members considered that such a provision had no merit as a measure to be recommended for adoption in Alberta.

The final topic reviewed related to exhaust emissions from certain automobiles which under apparently normal driving conditions are of a visual density to clearly indicate that excessive burning of oil within the engine cylinders is occurring. The emissions to the atmosphere from the tailpipe are of a visual quantity, density and colour to offend the senses of sight and smell. It was observed that certain older models of automobiles continue to be operated by owners who have no regard to the amount of pollutants the vehicle is contributing to the atmosphere. Such vehicles constitute a danger not only to the vehicle owner but to other road users.

There is no legislation which presently requires the emissions from an automobile exhaust system to conform to any set of standards for CO or unburned hydrocarbons. Vehicles emitting dense visible pollutants from the tailpipe constitute an unacceptable source of air pollution. It was moved by Mr. P. Rutledge that a recommendation be submitted to the Main Committee for consideration that automobiles putting out dense visually obvious exhaust emissions be banned from the roads under an appropriate section of the Highway Traffic Act.

Mr. Comstock moved that the Sub-Committee go on record in commending the Division of Environmental Health on the very excellent colour publications produced in January 1970 called Alberta Pollution Control. The publication, which is available to the public, sets down in considerable detail the work being carried out in the control of all forms of pollution in the province. It is worthy of wide distribution as an educational unit for those seriously interested in the care and control of the environment.

It is again fitting to report that the Calgary Chamber of Commerce, through its Pollution Control Committee, again sponsored a one-day seminar dealing with many aspects of pollution and its control as a public information and educational service. The all-day seminar was conducted at the Jubilee Auditorium on May 16th and featured many prominent speakers. All who attended found the subject matter to be most informative, profitable and very worthwhile.

Leslie C. Allan, M.B., Ch.B., D.P.H.

Chairman

Appendix K
DISCUSSION ON
REPORT OF TECHNICAL SUBCOMMITTEE NO. 8
AIR POLLUTION
CALGARY

PROFESSOR R. W. LONGLEY

One matter that came out in Dr. Allan's talk that I thought might bear further comment. He was commenting on the use of the wind directions in order to analyze the various intensities of pollution and remarked, if I remember correctly, the north, north-west winds were the ones that gave the highest pollution. Now I have to see the exact text to find out what he had said, but this is what I gathered from what he said. Now there have been examinations of the winds at Calgary. There have been a couple of reports published in the Canadian Meteorological Society publication Atmosphere, and these show that there is a diurnal variation of wind at Calgary such that north to north-west winds occur at night more frequently than they do in the day time and during the day time south-east winds are the most frequent. Therefore, it is awfully hard to sort this particular variation out and come up with a conclusion that north to north-west winds are the winds for high pollution. It may just be because high pollution occurs at night and also the north, north-west winds occur at night we may have here an answer for the relationship which Dr. Allen has suggested. Now as I say I would have to see the report, maybe this has already been taken into consideration.

DR. L. C. ALLAN

Well, as I say this hypothesis was really being studied from the point of view, it is my main consideration that the sulphation and H_2S factors were unnecessarily high in the city and that we are rightly ringed around by a certain amount of gas processing plants and it was this measure that we wanted to see what the air further removed from within the city was, and the initial indication is that it already contains a fair amount of these pollutants, before it ever enters the city if we make the assumption that these winds from the north, north west, west and south are the more common ones within the city, it would be interesting to see what the correlation is when the whole wind factor is put against the readings that we are obtaining.

Appendix LREPORT OF TECHNICAL SUBCOMMITTEE NO. 6WATER POLLUTIONNORTH SASKATCHEWAN RIVER

This meeting involved representatives of the subcommittee, industry, universities and other interested people. The meeting was broken into two parts, one part presented by myself, giving the overall water quality in the North Saskatchewan and the second part by Mr. Paul Paetkau of the Fish & Wildlife Division, giving his biological assessment over the past year.

Now commenting on the water quality in the North Saskatchewan, the historical problem of low dissolved oxygens in the North Saskatchewan River are pretty well absent. The river remained in quite a health condition with respect to dissolved oxygen, mainly because of greater control of oxygen demanding wastes discharged to the river.

Episodes of high odor did exist and these were primarily due to unauthorized discharges. We had one instance where a small firm discharged quite a significant quantity of oil into the North Saskatchewan River for reasons unknown to us. Levels of ammonia nitrogen and phosphorous continued to be excessive. However, further surveys in February and March showed a decline in concentrations of these constituents and I notice on our surveys this last month that the nitrogen levels are down quite low, in fact they are within our water quality guidelines. Unfortunately we cannot say that for the phosphorous levels. Choliiform organisms and E. Coli, this is an organism that is in the stomach, are excessive downstream of Edmonton and it would appear that control of these constituents should be exercised. Except for isolated episodes the level of oil and grease appeared to be acceptable. The amount of organics, however, as shown by carbon chloroform extracts at times appears to be high downstream of Edmonton. Samples were taken in the river for mercury and were within acceptable limits, mercury limit that we have established is .1 of a part per billion.

Chromium and pesticides were monitored and they certainly were within acceptable limits.

Getting around to the report of Mr. Paetkau's, he indicated that above Edmonton the percent of clean water organisms associated with the river indicates what is called a mature eco-system. The Beverly bridge site appears to be suffering from the effects of organic pollution. One finds a total eradication of clean water organisms at this site as compared to dirty water organisms. The habitat is now occupied by blood worms and sludge worms. This could be termed the degradation and active decomposition zone.

Mr. Paetkau indicated that the river does not begin to recover until Pakan bridge. This is fairly close to the divining sampling site.

At Duvernay, in fact the river is recovering with respect to the percentage of clean water versus unclean water organisms. Complete recovery to a mature Eco-system is achieved at Elk Point. Additional sampling between Duvernay and Elk Point may indicate a complete recovery in less river miles than shown.

E. E. Kupchanko
Secretary

DISCUSSION ON

REPORT OF TECHNICAL SUBCOMMITTEE NO. 6

WATER POLLUTION

NORTH SASKATCHEWAN RIVER

MR. F. A. VOEGE

This mercury examination in the river, was this conducted because of a source that was known or was it just conducted as sort of a data gathering and were there any samples run on the bottom muds if there were a source known?

MR. E. E. KUPCHANKO

The sampling was initiated some two years ago just in the regular routine program. We had some indication that there were mercury problems source in the Saskatchewan, so we initiated our own program, in fact probably two years ago to this date and there are no major sources in Alberta of mercury. However, we are convinced that possibly minor sources, utilization by universities, this type of thing, may be contributing to some of the fairly significant values in the fish downstream. There is no large source here. We have also sampled the industry to verify this. No samples have been done of muds as yet, and we certainly are contemplating doing this, this type of sampling. One of the problems we have is that we don't have the capabilities of analyzing for mercury in our laboratory as yet. We have had to use the facilities of the Federal Department of Energy, Mines & Resources, Water Quality Division, Stu Reeder's laboratory in Calgary. In addition we have utilized a small mercury sampler in Doctor May's section.

MR. H. LEMBICZ

I note in your report, Mr. Kupchanko, that the aquatic life in the river from a certain point, I didn't quite catch it, down to Elk Point was mostly blood worms in the water. Now how many miles would this be, would this condition be not suitable for fish in that area?

MR. E. E. KUPCHANKO

The actual condition, according to Mr. Paetkau's report, the fairly serious condition occurs approximately 20 miles downstream. He says that twenty miles downstream the river starts to recover. Now Mr. Paetkau indicated in his report it looks as though it is organic pollution, I firmly believe it is because of the discharge of spent lime material from the water treatment facilities, coating the bottom and rather than the actual gross organic pollution that Mr. Paetkau indicated in his report. I think Mr. Paetkau would verify that - he says yes.

MR. H. LEMBICZ

That would be lime deposits from the treatment plant?

MR. E. E. KUPCHANKO

Yes. Presently the spent lime is just discharged into the river, steps are being taken by the city to investigate the possibility of recovering this lime.

MR. H. LEMBICZ

It is very interesting because I read a while ago in the paper where they thought they had a sort of cure, I mean a treatment that was going to work out good for treating sewage and that was lime.

MR. E. E. KUPCHANKO

This is spent lime.

MR. H. LEMBICZ

This is spent lime, it has a problem there too.

MR. H. KRUSCHE

We are establishing our phosphates in the river as P205. I just wonder by coincidence whether this phosphate when it is analyzed is it in an insoluble form or is it instead a soluble form, since the river is carrying silt and other chemicals which precipitate normally all the phosphates from the detergents as calcium phosphate, we may be reporting phosphates which is already immune to the environment.

MR. E. E. KUPCHANKO

Right, what we report is total phosphorous or as phosphate. Now, as you will appreciate, there is a very complex interaction in the river basin within the phosphorous forms and to say that any one form is completely tied up is erroneous, because at some time later on it will be released because of interactions presently unknown and this is the whole problem in lakes, you get all of a sudden a release in phosphorous presumably and an alga bloom and the same thing in rivers, because you feel it is tied up doesn't mean it is really tied up. It is tied up for a period of X days and may in fact be released. But we analyze for total phosphates.

MR. H. KRUSCHE

It is a known fact that the formed phosphate is harmful when it goes into a lake, but if it goes into a silt carrying river like the North Saskatchewan, which is an exception with lots of silt, then the phosphates are harmless to environment because they are precipitated permanently.

MR. E. E. KUPCHANKO

This is a fact, that the limiting nutrient in lakes seems to be phosphates. Now there is a bit of controversy in this respect, but the limiting nutrient in rivers is the nitrogen forms. Why this occurs I don't know, rather than phosphorous, may be because exactly what you said, it seems to be tied up to some extent by the silt.

DR. WALTER BUCK

This is going to be a rather peculiar question, Mr. Kupchanko, but I think that I would like to have you comment on it, to see if there is any truth to it or not, and this was the newspaper report that said if the industries want to dump junk into the North Saskatchewan River the time to do it is Saturday or Sunday because people do not work except Monday to Friday. Could you comment on that please, Gene?

MR. E. E. KUPCHANKO

No, our people work Saturdays and Sundays too, I am sorry to say.

Appendix NREPORT OF TECHNICAL SUBCOMMITTEE NO. 9AIR POLLUTIONEDMONTON

Last year I was able to report that generally the measurements of pollutants in the atmosphere over the City of Edmonton revealed levels well below those considered hazardous to man. By and large I bring you a similar assessment this year.

Fluctuations of contaminants of course took place, but were largely of a local nature. Comparison of absolute values with the recently established provincial standards are quite reassuring.

The only area to give concern lies in the measurement of dust pollution in industrial areas. The measurement of dust pollution in residential areas were close to the maximum permissible. However, those levels measured in the industrial areas were considerably above the permitted values. Interpretation of this is difficult in that we know little of the natural background of dust in these areas. While accepting that there are many industrial processes in and around the city which are dust producing and that demolition is a continuing problem due to the renewal of buildings, we also are aware of long periods without rain in the summer when naturally by wind and by virtue of vehicles much dust is raised. Equally we are aware of many areas where the top soil has been removed and sold.

Readings of other contaminants from the survey stations have proved very satisfactory. Oxidants run very low by provincial standards - 0.029 p.p.m. against a standard of 0.10 p.p.m. Oxides of nitrogen averaged 0.013 p.p.m. against 0.10 p.p.m. The value obtained for smoke was approximately half of that permitted. The measured suspended particulate matter lies within the levels permitted.

We view with interest the hydrocarbon levels in the atmosphere, but find intelligent interpretation somewhat difficult. Our community burns large amounts of natural gas. Presently the contribution of the elements of natural gas to the total hydrocarbon measured in the atmosphere is not yet clear.

Both hydrogen sulphide and sulphur dioxide are measured and reported by the Environmental Health Services Division in units of SO_2 equivalent milligrams per day per 100 square centimeters. The Provincial Air Quality Standards are expressed in parts per million. It is therefore difficult to translate one unit into the other. However, hydrogen sulphite concentrations both in industrial and residential areas decreased from last year.

Total sulfation at all stations indicated an increase but well within what most authorities consider to be acceptable levels for the areas of consideration.

The only source of sulphur compounds around Edmonton are the refineries. Therefore we are dealing with a general problem of SO₂ contamination from burning coal which may have as much as 4% sulphur or fuel oil, which may have up to 2% sulphur, only with a nuisance type of refinery odor connected with processing crude oil.

The frequency of complaints of offensive odors has decreased from last year at this time. The atmosphere has been generally more turbulent, only 2.3% of the days this year have been calm. Furthermore industry has been selectively controlling offense by not operating those procedures most odorous during critical winter months.

This fall in particular we have observed streaks of greasy black smoke over the city particularly in the mornings, suggesting night burning in the oil-fields. Equally in the fall large amounts of smoke have been added to the city atmosphere from farming areas by stubble burning.

While open burning is no longer permitted, domestic incineration continues. Operators appear unable, despite substantial educational efforts, and posting of written instructions at the incinerator, to control the performance of their incinerators.

The subcommittee on Air Pollution (Edmonton) held three meetings during the year. The meetings were quite well attended and discussion was free and active.

Mr. Hogge addressed the committee on Bill 52, outlining the purposes, membership and other aspects of the act. Mr. Dobko was also requested to address the committee. In brief Mr. Dobko indicated that in the past three years industry in and around Edmonton has spent approximately 2.2 million dollars on pollution control. Mr. Dobko outlined the procedures and types of investigations undertaken and indicated the various devices and techniques for which the department has issued approval.

The Hermitage Development received considerable attention and it was apparent that the subcommittee was unhappy that this development had been permitted to proceed. There is an essential irrationality in this situation, in that industry is not permitted to locate within one mile of residential areas but there is nothing to prevent residential areas encroaching within one mile of industry.

Again there was considerable discussion in relation to informing the public of existing pollutant levels in a meaningful way and instructing the public of their responsibilities. Pollution indices were discussed and ways and means of interpreting local data to the public.

In the matter of governmental responsibility, in May the subcommittee recommended the appointment of ministers at the federal and provincial levels to be in charge of pollution. It is noted that since that time these measures have been undertaken or promised.

The pollutants released from internal combustion engines were considered and correspondence undertaken with the Minister of Health and the Minister of Highways and Transport in this regard.

Through the meetings the following resolutions were developed and are submitted from the subcommittee on Air Pollution - Edmonton.



1. THAT the Division of Environmental Health study and publish any criteria they use to locate industry with respect to type of industry, transportation systems, urbanization, changing technology, obsolescence, total environment management, safety factors and any such other considerations as may be deemed advisable.
2. THAT the Air Pollution Control - Edmonton Subcommittee recommend to the Department of Health that they bring forth through the news media, for the general public, the ways in which they can personally help fight pollution.
3. THAT data on ambient air pollutants presently measured in the City of Edmonton be regularly published and related to standards of pollution as accepted in Alberta and related to yearly averages.
4. THAT there be Ministers in charge of pollution at the provincial and federal levels.
5. THAT the subcommittee ask the main committee to investigate the pollution arising from the use of two cycle engines in such implements as outboard motors, lawn mowers, snow mobiles, etc.
6. THAT the Information and Education Subcommittee recommend the immediate stocking of libraries both University and Public, with information on pollution and that they investigate other methods of adult education in pollution dangers in the Province of Alberta.
7. THAT the authorities of the provincial government recognize that the emission from buses, trucks and delivery vehicles operating within the City of Edmonton are high relative to their number; also there exist vehicles which will emit less polluting materials, therefore the provincial government should encourage the owners of such vehicles to purchase new or replacement vehicles which will emit less pollution into the environment. The encouragement could be in the form of financial grants by reduction of license fee or by some other means.
8. THAT through legislation all municipal, industrial and commercial enterprises register yearly with the Department of Health the pertinent details of each and every pollution stream discharged to the general environment and that a yearly permit be required for such a practice, and furthermore that all the pertinent details of each stream become public knowledge - without resort to confidentiality or secrecy in any form by the Department.

G. H. Ball, M.B., Ch.B., D.P.H.
Chairman

Appendix ODISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 9AIR POLLUTIONEDMONTONMR. W. J. YURKO

Mr. Chairman, I would like to ask about recommendations #1 and #8, Number 1 being the Division of Environmental Health study criteria which are presently used and may be used in the future with respect to locating industry. We recognize that there is a problem. I use the word sequency with reference to the location of industry and that this body of information must be brought up before the public, particularly a group of this nature which is technically inclined to see if in fact it is adequate and see if it should be modified, added to and so forth. I think it is recognized there that we are talking about such things as the location of industry next to urban centres. It is rather surprising that the one mile limit that has been used has never had any jurisdiction from the standpoint of being a written regulation, an acceptable regulation with respect to the political process. Furthermore that such things as the location of industry with respect to water supplies, location of oil and gas pipelines with respect to water supplies, the characteristics of the pipelines, safety factors and so forth, with respect to crossing critical water supplies, the design of various installations which are located near water supplies, the location of oil wells near water supplies, some of these regulations exist. I am particularly impressed with the regulations that are associated with the Oil & Gas Conservation Board. I think all this information should be compiled and should be submitted for review to a committee of this sort and it should be done at the earliest opportunity.

Now with respect to recommendation #8, which is a registration of each and every pollutant stream that leaves the confines of the industrial enterprise, this is now required by the Oil & Gas Conservation Board. As a matter of fact they are far stricter than requiring registration once a year. It is my understanding that in a number of instances they require that the information be supplied daily and that there is consideration being given to tying in some of these effluent streams to a computerized program so they could be examined almost instantaneously. The same sort of effort is required in all our industries, and not only the oil and gas industry and again with respect to making this information public, it certainly is public information, whenever an industry or municipality, or a commercial enterprise, releases a stream of any kind onto the general environment that affects the people in the environment generally, then this is public information or it should be public information. I am not overly impressed with the statement that was made that the government is not in the printing business. The government has this responsibility to its people who are interested in this information. When a government has a budget of something in the order of 1.1 billion dollars then surely it can supply in written form information with respect to something as vital as this to anybody who is interested.

DR. E. TOLLEFSON

I would just like to comment on Dr. Ball's comments on the smoke travelling across the city under certain conditions. When I was living here in Edmonton about three and a half years ago there was a permit required if you burned trash in your backyard. Now this gave the fire department some control, depending on wind conditions on whether one should burn or not. It seems to me that there should be a permit control system over any burning in the rural areas as well, so that if the weather conditions were not right, if the wind direction was not right, if inversion conditions were such that it would carry the smoke directly over the city, then this burning should not be permitted. Has there been any thought given to setting up such a permit system here in Alberta.

MR. S. DOBKO

To answer directly, there really hasn't been any thought given to putting a permit system on this type in operation. One of the items that I brought forth this morning was that the smoke allowables are being decreased quite drastically. Since the oil field operations are under the Oil & Gas Conservation Board, I understand that they will be applying those requirements directly onto the oil field burning. The point brought up about night burning is a very dead one and on many occasions there have been lengthy discussions regarding this particular item and it was felt that there was some type of regulation, part of a regulation, written up where it would allow burning between certain hours during the daytime. This might be the answer and until it is directly evident that this is required I am certain that the Provincial Board of Health or any other authority will have the foresight to be able to put something in like that. The general burning in the rural areas is to some extent controlled through some of the Department of Agriculture requirements. I believe this is sifted down to the municipal districts or counties where stubble burning in some areas is done on a permit basis. From time to time there have been problems encountered in administering something like that, but I think in this day and age that this will be overcome on the basis of the grave concern on pollution.

MR. H. LEMBICZ

Mr. Chairman, I don't like to be jumping all the time, but there is one thing that bothers me and in regards to report from Dr. Ball, he mentions that air pollution conditions were acceptable, the past year, matter of fact, it has decreased a bit from the year before. This word "acceptable" bothers me because last winter my brother was in the University Hospital and I was coming up from the south on the highway and a nice clear day and when I got to the outskirts of Edmonton, we were met by what looked like a fog, but as soon as we entered that fog we knew what the situation was because you could taste the stuff. It was just that thick you could hardly see where you were driving. Of course it might have been that particular day the atmosphere was just right, the wind was from the north-east and there was a depressing atmosphere, but we drove into the parking lot at the hospital before I could really see the hospital building. Now is this acceptable, in my opinion we should not consider this as acceptable. This is a dangerous attitude, what are we prepared to accept, I think we should not consider that as acceptable.

DR. G. H. BALL

You may recall last year, Mr. Lembicz, we spoke at considerable length in regard to the matter of release of water vapour and the accumulation of ice crystals in the atmosphere over the city. I don't recall off-hand the actual figures, but from industry there is a phenomenal amount of water vapour released into the atmosphere in the environment of the city, particularly from the water cooling towers. An equal amount is released into the atmosphere of the city from the burning of natural gas to heat buildings and so forth. Now this is water vapour per se, you burn natural gas, it burns to oxide of carbons and to water vapour and that's it. In itself this is relatively without hazards, in other words it is not toxic. Given an inversion, you get a substantial build-up of this and of course given the stillness of an inversion it hangs around the area where it is produced, so the city does get clouds of water vapour and fog. Now what happens within this fog is relatively an open question - I agree with you. There is no doubt that moisture will precipitate in cold weather on particulate matter. There is no doubt that there are a number of the pollutants which are released to the atmosphere are water soluble. These are areas which I don't think I can comment on and I am not even sure that the experts can comment on because I am not aware of any substantial amount of research going on into the actual content, but basically it is water vapour and it is a meteorological phenomenon in association with an extremely large amount of water vapour which communities of this size, in these northern latitudes must produce. Now I have my own personal strong feelings about this because I think this really does affect the nature of life, of people in cities. It is part of the penalty we pay for being so far north and having the type of climate that we have. But nevertheless 75% of the population of Alberta now live in our urban environment and for some times we have remarked on it - weeks at a time - the urban, city dweller doesn't see the sun and it is the release of our own water vapour from our heating and from industrial processes. This is one of the things it seems to me should be tackled on an intelligent basis. I understand that there are means whereby industrial processing can be cured without resource to water cooling towers. I understand that in Texas there is a similar industry which cools without the use of water vapour. Now here we have winter, it is much much colder, and if they can do this in the Texas desert where it is hot, surely it can be done here. As regards the matter of the release of water vapour, 50% of the water vapour which is released to the atmosphere comes from our heating devices. As regards the release of water vapour from our heating devices, this is a different problem again and such controls to relieve water vapour from the effluent from our heating devices - imagine sticking these on the top of every domestic furnace, a substantial amount of money involved and I am not really very sure of the practicality of it, so this in itself I don't really know. We are well aware of what you say, Mr. Lembicz, and we sure don't like it.

MR. S. DOBKO

On this particular aspect Mr. Lembicz mentioned about tasting the stuff, well this is a bit of a problem of this fog laden with odor. During these periods of time we have made measurements of various types of pollutants which have a very low threshold odor level and I believe the maximum concentration of any of these compounds we found was in the range of .1 parts per billion. Most of them were below the detectable limit of the estimate which was .05 parts per billion.

Appendix PREPORT OF TECHNICAL SUBCOMMITTEE NO. 5WATER POLLUTIONBOW RIVER

The fourth meeting of the Bow River Subcommittee was held at the Bonnybrook Sewage Treatment Plant on June 4, 1970.

This was a combined meeting of the Subcommittee members, industrial users, and other interested persons, about 40 people altogether. Mr. A. H. Nicholson, Chairman of the Bow River Subcommittee, brought the meeting to order at 9:00 a.m. He indicated the topics that would be discussed during the meeting which included a review of the Bow River Pollution Survey Summary Report 1969-1970 and the pollution survey of the Bow River carried out by the Fish and Wildlife Division. In addition, a tour would be given of the new secondary facilities under construction at the Bonnybrook Sewage Treatment Plant.

Mr. E. E. Kupchanko presented the Summary Report on the Bow River Pollution Survey - 1969 - 1970. Mr. Kupchanko indicated that the Bow River did not suffer markedly during the past winter from the load imposed on it. Due to a relatively warm winter and warm effluents from both industrial and municipal outfalls, complete ice cover downstream from the City of Calgary was not evident at Stier's Ranch or at Carseland Bridge. A review was made of the pollutant load to the Bow River. The maximum Biochemical Oxygen Demand load observed was 78,360 lbs/day. When flows dropped below 2,000 c.f.s. a relatively high concentration of phosphates and nitrogen was observed in the Bow River. Occasional high loadings of phenols were observed during the surveys of December 9-10, 1969 and February 23-24, 1970.

Ammonia Nitrogen loadings to the Bow River ranged from 8,604 lbs/day to 11,490 lbs/day.

The Dissolved Oxygen concentration at Cushing Bridge was in all cases very near 100% saturation. The lowest Dissolved Oxygen reading recorded at Stier's Ranch was 5.2 mg/l recorded October 21, 1969. Threshold Odor tests revealed the river water had an odor of expected strength (2-8). However, an odor of a chemical nature was observed on three occasions. No oily odors were observed in the Bow River.

Relatively high concentrations of bacteriological constituents were observed immediately downstream of Calgary, however, tests show that there is a die-away of these organisms further downstream of Calgary. Mr. Kupchanko indicated that the installation of the secondary sewage facility at the Bonnybrook Sewage Treatment Plant should reduce the pollutant load substantially and a decrease in phosphates, oil and grease, and biochemical oxygen demand should be noticed during next year's sampling surveys.

Mr. P. Paetkau then presented the report entitled "Summary Report - Biological Pollution Survey - Bow River". This report summarized the biological results obtained in the Bow River during the period August, 1969 to May, 1970. Mr. Paetkau commented that at the Stier's Ranch location, the

clean water organisms were reduced to less than 10% of the total animals found. At Carseland Bridge 20-30% of the animals counted were clean water animals representing a reduction of approximately 50% from the mature ecosystem site (upstream Calgary).

At the Cluny sampling location, total recovery in clean water organisms was observed. Mr. Paetkau mentioned that the biological results from the Bow River reflect a classic organic pollution picture. The site above Calgary represents the clean water zone (the mature eco-system) while Stier's Ranch represents a young eco-system or an area of degradation and active decomposition. Active decomposition occurs with the resultant increase in growth and production of organisms but at a loss of quality. At Cluny Bridge, a mature eco-system or complete recovery has once again been established.

A general discussion then took place, and at 10:15 a.m. the meeting adjourned for the subsequent tour of the Bonnybrook Sewage Treatment Plant. This tour impressed those attending the meeting with the size and complexity of the operation.

Since the secondary treatment of the plant was not in operation at the time of the meeting which was in the first week in June of this year I asked our Sewer Engineer to give me a brief report on what had occurred since then and how the plant was functioning. I will read this report now since I feel it is of interest to this meeting.

SECONDARY TREATMENT AT THE BONNYBROOK PLANT

Construction, to increase the primary facilities to 65 MIGD and add secondary facilities with a capacity of 52 MIGD, was started in November 1968. Extreme temperature conditions in January and February of 1969 caused construction to get off at a slow start. By the end of 1969 construction was 60% complete. The original completion date of June 30th, 1970, was not met although portions of the plant were put into service by that time.

The control building was occupied in Early April, 1970. One half of the secondary treatment facilities were put in operation on August 18th, 1970, and the balance were put into service on October 5th, 1970. The primary clarifiers and the digesters were put into service in the latter part of September and early October. Flow was turned into the aerated grit tanks in mid October, 1970. Renovations to the existing detritor portion of the headworks section are still under way.

The attached graph showing the daily average of B.O.D. of the final effluent shows a reduction in B.O.D. since secondary treatment facilities were put into service. The average of 55 to 60 mg/l is not very close to the 20 mg/l or less expected. It is difficult to obtain the desired efficiency until after the process has had time to stabilize. As can be seen from the graph in Figure 1 a downward trend is apparent in the beginning of November. This also shows up in the total river loading in Figure 2. During previous months the process has been disrupted by changing flows, thus seriously overloading or underloading portions of the plant, to comply with the construction schedule or allow for initial testing or start-up difficulties.

The attached table indicates that the average daily B.O.D. at Bonnybrook is approximately 180 mg/l. The loading on the river has increased each year. This is due to the increase in flow.

From about mid October the average B.O.D. loading to the river of 4000 lbs. imposed by the Provincial Department of Health has been achieved and since the first of November the loadings have averaged well below 30,000 lbs.

Although the average daily B.O.D. and the river loading have decreased since secondary treatment facilities have been in service, the design efficiency has not yet been reached. Some time is still required to get all parts of the plant functioning properly. The City has engaged Dr. Hatfield, a man well known for his work in the sewage treatment field, to assist in plant start-up and to familiarize plant personnel in process control methods.

A. Nicolson
Chairman

AVERAGE B.O.D. AND RIVER LOADING FOR CALGARY

TREATMENT PLANTS

		BONNYBROOK	FISH CREEK	OGDEN	TOTAL
Average Daily B.O.D. Effluent (mg/l)	1966	156	77	45	
	1967	187	112	61	
	1968	193	110	59	
	1969	181	116	103	
	1970*	180			
Total River B.O.D. Loading (lbs/day)	1966	54,912	2,511	286	57,709
	1967	63,019	3,640	498	67,157
	1968	67,064	3,483	406	70,953
	1969	68,924	3,765	503	73,192
	1970*	69,836			

* Average - January 1st, 1970 to July 31st, 1970.

A. Nicolson
Chairman

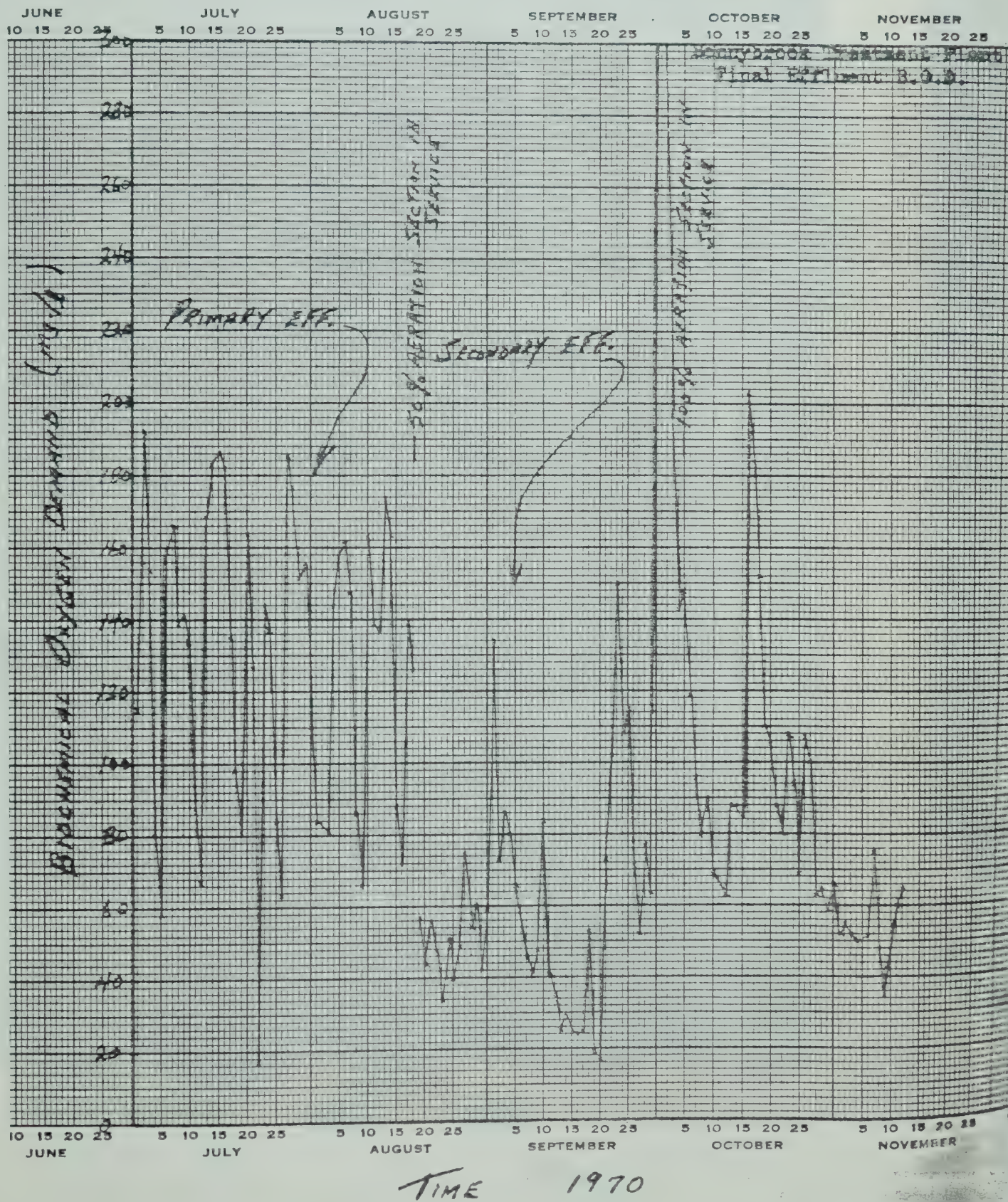
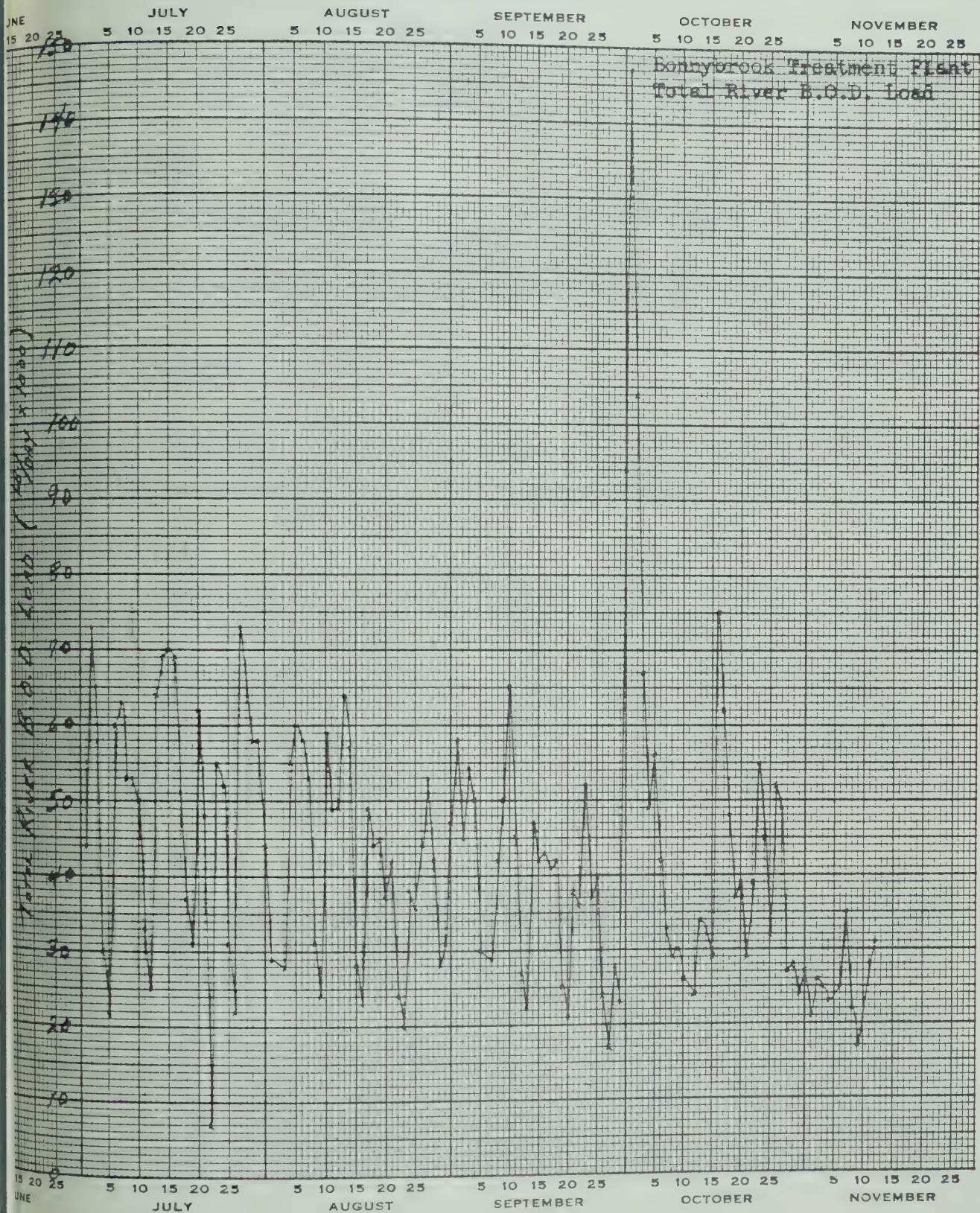


FIGURE I



TIME 1970

FIGURE 2

Appendix QDISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 5WATER POLLUTIONBOW RIVERMR. F. A. VOEGE

I wonder in this mention made of the high phosphate and nitrate concentrations in the river and I forget where they occurred and the fact that there was mention made of a biological report. Was there any notice made of what concentrations of algae and aquatic organisms occurred at the high loadings or high concentrations?

MR. E. E. KUPCHANKO

Frankly our section does not have a capability at present to monitor algae or other ecological phenomena. There was a severe amount of weed growth downstream of Calgary and we are watching this in the light of the increased treatment to see if in fact the weed growth desists.

DR. E. TOLLEFSON

I would like to ask a question regarding the phosphate content anticipated in the effluent from the Calgary sewage disposal plant. When one looks ahead we see Diefenbaker Lake coming into play as a recreational area and it has recently been announced that there is a possibility of another recreational lake being established just downstream from Calgary. What about the operation of the Bonnybrook Plant? Is it going to be able to take care of this phosphate to the point where it will be acceptable for use in a recreational area, that is so that there won't be algae growing, so that the lake would be useable?

MR. P.D. LAWSON

When the report on the Bonnybrook Plant was done which I think was at the end of 1966 there was no requirement from the Board of Health regarding nutrient removal, but we did consider this in the design and one of the reasons for the method of sludge disposal adopted was to reduce the amount of nutrients entering the river. As you may know, you can remove a fair amount of phosphorous in the activated sludge process and it is concentrated in the activated sludge but it comes back into solution when the sludge returns to the aeration tanks and the sludge disposal method adopted at Bonnybrook is to digest but to have no digestive supernatant. The supernatant and the sludge is being pumped some seven miles to sludge lagoons at Shepherd where the supernatant liquor will be spray irrigated and this way we feel that the amount of phosphates in the effluent will be greatly reduced.

MR. P. E. DUBEY

It seems everyone is interested in phosphates and I am interested in this and concerned because I don't seem to understand the situation

completely. I understood originally that the chief source of phosphate pollution, if you put it this way, in the rivers and waterways was due to industrial activity and to sewage effluent, but then I was told from a reliable source lately that Alberta is a phosphorous deficient area, there is some question then as to how much phosphates are actually in sewage and where is the majority of these phosphates coming from. They must be coming from other sources if Alberta is a phosphorous deficient area, there must not be too much in the sewage and I was just wondering about this, maybe you can explain.

MR. E. E. KUPCHANKO

Well, if you look at sewage itself, 50% of the phosphates in sewage come from human waste and the other 50% from other types, possibly detergents. It is slightly less now that federal legislation has been enacted. One comment on the amount of phosphate removed by the sewage treatment plant, our studies at Bonnybrook and this is when the plant was not operating as good as it could be, we found it was removing about 25% of the phosphates going through the plant, which is not bad considering the plant was just in a period of start-up. Does that answer your question?

MR. P. E. DUBY

There has been a lot of publicity about detergents and this man stated publicly that of all the nutrients going into our waterways, detergents were only responsible for about 8/10ths of 1% and then I get this other statement, you know, that our area is phosphorous deficient, that is below normal, which would indicate that unless phosphorous is artificially implied, you know our food would - the human body would use most of the phosphorous that it gets through our food and it seems odd if there is so much phosphorous which is the main cause of algae population explosion - at least I understand this - where all this stuff is coming from?

MR. E. E. KUPCHANKO

As far as phosphorous in the soil I wonder if Mr. Goettel would comment on this. He is the soils expert here.

MR. A. W. GOETTEL

I was wondering how long I could hide from you, Gene. I have a technical bulletin from the Inland Waters Branch that I just received the other day and they have done, as many of you know, a fair amount of work in Ontario and the United States, on Lake Erie and Lake Ontario and appreciate having an expert from that area here. With respect to phosphates in soil and fertilizers and also in lake sediments, the question came up earlier, I think insofar as those sources are concerned these would not necessarily get to water supplies except through erosion or physical erosion of the material itself. With respect to phosphates in detergents and human wastes, there has certainly been a lot of talk about using these as fertilizers. I think if you realize that the concentration of these nutrients in sewage would be very low or very small and that until they would be concentrated to a point in some process whereby they would be economically feasible to use as fertilizer this would be a disposable method. Just looking at the sources of phosphate that go into the two major lakes that were under discussion in this report, they look at municipal, industrial and land drainage and land drainage, of course, would include agricultural activities as well as natural

drainage I assume and looking at the two lakes here they indicate that 64% of the phosphates come from municipal sources, 7% from industrial and 21% from land drainage. This is into Lake Erie and Lake Ontario the figures are approximately in that same proportion. What I am pointing out here is that it appears that the detergents are a source of phosphates, now whether they talk about removing them here as a phosphate control program, the reduction and eventual removal of phosphates from detergents, phosphate removal from the sewage treatment plants and also a program to reduce agricultural contributions through erosion control, fertilization practices and animals wastes, so I don't know if this quite answers your question, Phil, but it may throw a little more light on to it I hope.

Appendix RREPORT OF TECHNICAL SUBCOMMITTEE NO. 7WATER POLLUTIONOLDMAN RIVER

Since the meeting of the Alberta Advisory Committee on Pollution Control held on October 15 and 16, 1969 the Technical Subcommittee on Water Pollution Control - Oldman River held two meetings in Lethbridge on May 26, 1970 and October 14, 1970.

During these meetings the following items were discussed:

1. Summary Report - Oldman River Pollution Survey 1969 - 1970 presented by Mr. E. E. Kupchanko. Mr. Kupchanko indicated that conditions with respect to dissolved oxygen existed in the Oldman River especially below Picture Butte and below Taber. This extremely serious oxygen depletion commenced December 3, 1969 and continued for approximately three months. A period of low dissolved oxygen in the Oldman River was evident after the sugar beet refining campaign ended in January and could be attributed to the municipal waste discharge from the City of Lethbridge.

It was also mentioned that the relatively low river discharge rates contributed to the oxygen depletion in the Oldman River.

2. Summary Report - Biological Pollution Survey - Oldman River presented by Mr. P. Paetkau. Mr. Paetkau summarized the biological results obtained in the Oldman River during the period of August, 1969 to April, 1970. Mr. Paetkau indicated that at Highway No. 36 Bridge, the clean water animals have been virtually eliminated as shown by his spring sampling. Mr. Paetkau also pointed out that the reduction in clean water animals could be attributed to a condition in which additional oxygen demanding matter was introduced during the sugar beet campaign. Introduction of solid material during this campaign also contributed to the loss of habitat which resulted in the extreme reduction of the total number of animals downstream of Taber.

Mr. Paetkau stated that five miles downstream of Lethbridge no clean water animals were found probably due to the extremely low flow rates in the Oldman River.

The effect of the reduction in these organisms was questioned. It was indicated that this condition would prevent Walleye and Pike from spawning because of the loss of micro-invertebrate population. Goldeye which are migratory fish would not be significantly affected.

3. It was reported that complaints were received by the Division of Environmental Health from the City of Medicine Hat about condensor scaling.

The problem of condensor scaling at Medicine Hat was discussed. It was reported by Mr. Kupchanko that the City of Medicine Hat has indicated to the Department of Health that during the spring the Medicine Hat power plant lost 5,000 K.W. of power production capacity due to condensor scaling.

The Committee recommended that a study be carried out of the problem of condensor scaling at Medicine Hat and the results be presented at the next meeting of the Subcommittee.

4. It was reported that complaints were received by the Division of Environmental Health from the City of Medicine Hat that particles of sugar beet were clogging the power plant intake screens. Mr. Hayward commented that the Canadian Sugar Factories were not solely responsible for the particles of beet and other solid material in the Oldman River. He mentioned that the Department of Health studies show that the particles of beet contribute very little to the Bio-Chemical Oxygen Demand and the resultant low oxygen levels in the Oldman River and emphasized that the particles of beet are not the major pollutant.

Mr. Haugen stated that his observation last winter revealed a grey "sphaerotilus" type of material coating the river bottom downstream of Taber.

5. Flow in the Oldman River was discussed. Mr. Deepröse mentioned that the Water Resources Division has had a number of discussions with PFRA and an agreement has been made to follow the recommendation by Water Resources for minimum flows in the Oldman River.

RECOMMENDATION: Moved by Mr. Haugen and Seconded by Mr. Hayward.

In view of the possibility of low water levels this year in the Oldman River, the regulation of flows as recommended by the Water Resources Division would be beneficial and should be continued. If the recommendations in the Water Resources Division report on the minimum flows of the Oldman River system cannot be met, early consideration should be given to the construction of additional storage areas.

6. Oldman River Basin Upstream of Lethbridge was discussed. It was mentioned that problems exist with coal mining operations on the various tributaries of the Oldman. These problems have been investigated in detail by the Water Resources Division and the Fish and Wildlife Division in Lethbridge.

RECOMMENDATION: Moved by Mr. P. Paetkau and Seconded by Mr. Graveland.

Appropriate action be taken by the Government on pollution problems located on the Crowsnest River, McGillivray Creek, Vicary Creek, Racehorse Creek and Dutch Creek.

7. Industrial Activity on the Oldman River Basin was discussed. It was pointed out that the capacity of the Oldman River basin is rather limited in relation to the location of new industries with a high pollution potential.

RECOMMENDATION: Moved by Mr. Hayward and Seconded by Mr. Paetkau.

With reference to industrial activity on the Oldman River basin, all municipalities be instructed to take into consideration the consequences of accepting or promoting new industrial development in relationship to any pollutional load imposed on the Oldman River.

8. Summary Report - Oldman River Pollution Surveys. The presentation of annual reports was discussed in the light of recommendations in a letter received by the Subcommittee from "Pollution Control Southern Alberta". Some of the difficulties in preparing and presenting the reports were mentioned by Mr. Kupchanko.

RECOMMENDATION: Moved by Mr. Paetkau and Seconded by Mr. Deepprose.

The annual river reports firstly be discussed in a closed subcommittee meeting and that the reports be presented at a public meeting (preferably in the evening) shortly thereafter.

9. Feedlots and the Issuance of Sand & Gravel Leases were discussed.

Attention was directed to the question of location of feedlots near watercourses and the issuance of sand and gravel leases. It was mentioned that the Department of Agriculture was carrying out a number of studies on feedlot operations. The issuance of sand and gravel leases in the river channel appeared to present a siltation problem due to improper removal practises.

It was agreed that further studies be carried out in relation to sand and gravel operation and feedlots along the Oldman River.

PROGRESS REPORT

It is the opinion of the Subcommittee that considerable progress is being made in resolving the problems associated with pollution on the Oldman River.

Construction of a secondary sewage treatment plant for the City of Lethbridge is progressing favourably. Construction of the interconnecting pipe-line between the South and North Sewage Treatment Plants has commenced. This pipe-line will convey primary effluent from the South to the North plant to receive secondary treatment. The target date for completion of the project is September 1st, 1971. The total estimated cost is \$4,600,000.00.

The City of Lethbridge will investigate the incorporation of a spent line system at the water treatment plant.

The Canadian Sugar Factories Limited report their effluent at Taber was screened through a travelling water screen and that further screening is being considered in 1971. It was also reported that a Calcium Carbonate removal system has been installed.

It was reported that the Town of Taber were having some difficulties with their effluent which have been corrected. A newspaper report states that work on the Taber lagoons is nearing completion.

The Pollution Control Southern Alberta Committee is very active in the City of Lethbridge. The board of directors includes interested citizens from the professional, technical, business and student world. Members of this Committee were invited to attend a meeting with the Sub-Committee on May 26, 1970 and the following recommendations were received at a later date and these recommendations will be considered prior to our next meeting.

1. If the meetings are for the presentation of public information, then may they be so publicized.
2. That future meetings be held during the evening to allow interested citizens a chance to hear the reports.
3. That the locations for the meetings be held in a large enough room to accommodate the interested public.

Student interest in problems associated with pollution, and its control and abatement is running high in our area. This is borne out by public interest in a report entitled "The Dirty Oldman" prepared by a grade twelve biology class at Winston Churchill High School. The report was presented to His Worship Mayor A. C. Anderson and members of City Council, published in full by the Lethbridge Herald and many copies have been distributed to interested groups.

We also receive many inquiries from students for literature pertaining to pollution and for the loan of reports and other material.

The subcommittee recommends the preparation and distribution of pamphlets, booklets and other material relating to pollution control and abatement and the distribution in volume to City Halls, Town Halls for hand-outs to students and other interested citizens.

The subcommittee also agreed that recognition be given to the sulphur plants in the Oldman Watershed, The City of Lethbridge, Canadian Sugar Factories Limited, Town of Taber and others for their efforts in the Control of Pollution in the Oldman River.

The Subcommittee wishes to express its thanks to the Department of Health and other Provincial Government Departments for their attention to the recommendations of the subcommittee and to all groups and individual citizens who have taken an active interest in the work of the Committee.

Co-operation at all levels is the key to pollution abatement. We must do everything possible to assist the youth of today to turn the key which will open the door to a cleaner, brighter world.

E. A. Lawrence
Chairman

Appendix SDISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 7WATER POLLUTIONOLDMAN RIVERMr. H. LEMBICZ

Mr. Chairman, I note on the report this morning that Taber is setting up sewage facilite which uses their effluent for irrigation. I was wondering why these sugar refineries that are along the Oldman River dumping pollutants into the Oldman River why they couldn't do the same thing. Why couldn't they use their effluent for irrigation? Would this be possible? If Taber can do it, why can't the sugar refineries?

MR. E. LAWRENCE

It is difficult to answer that question completely, but it is largely dependent I think upon the ability to store the large quantities of water that are sourcing from these plants and the other thing of couse is the relatively short irrigation season. I think that perhaps this has been looked into and a fair quantity of this effluent could be used for irrigation purposes. Here again it is dependent to a large degree upon the type of year, whether it is wet or dry and of course the problem of holding this perhaps through the winter season. I think it is primarily a matter of storage, but it doesn't mean to say that it can't be used for the irrigation of forage crops. I don't know whether it has been accepted as being suitable for other types of row crops or not, I am not prepared to go into that matter.

MR. H. LEMBICZ

While I am up here, Mr. Duby at the last report asked the question how much phosphorous would sewage leave in the soil. I have information from the Lethbridge Research Station that says that in a normal year of irrigation with sewage, that there was 40 pounds of phosphorous and 40 pounds of nitrogen deposited in the soil, if that answers your question Mr. Duby. 40 pounds per acre deposited in the soil. Maybe somebody is here from the Research Department who could verify that.

MR. D. C. MACKAY

I think these figures are correct and the only thing I think I need add is that this would be highly desirable treatment rate for most crops. This could be utilized to advantage in the production of many vegetable crops as well as forage crops or cereals.

MR. E. E. KUPCHANKO

Certainly one of the problems with irrigation with sewage is the actual compatibility of the sewage with the soil and the tests done down in Taber were quite extensive to insure at the rates proposed, this soil would not block off or there would be any detrimental effect on the soil. I think this is very important, because you just can't take any old sewage and any old soil and expect to irrigate.

MR. H. M. HAYWARD

Specifically Mr. Lembicz in answer to your question about our company investigating the use of effluent as irrigation water, Mr. Kupchanko can correct me on my facts, but the volume of effluent that our two plants produce, relative to the town of Taber, is in the factor of about 10 to 1 where we produce about ten times as much effluent. I believe the town of Taber now are spending somewhere in the neighbourhood of \$300,000 for their lagoon and irrigation system. One of the interesting factors, and I digress a little bit here, is that the land value for lagooning becomes quite expensive when the people realize that all of a sudden prairie land is going to be used as lagoons, so there is a bit of a real estate escalation here. We ourselves, as mentioned in here, we put in a calcium carbonate disposal system this year and we investigated what we termed unused land to dispose of this material and surprisingly enough the price asked was quite high. So what I am trying to say is that we have done investigations to a degree into lagooning, irrigation of our effluent, but the old cost factor comes in again and surprisingly enough this method could be quite expensive for our particular case.

DR. G. H. BALL

Many years ago I investigated a typhoid outbreak which was attributable to irrigation of vegetables, garden area with sewage which had been through primary secondary treatment. This is a very disturbing experience. I claim to come from Missouri and I want pretty definite evidence that any sewage effluent that is used for treatment of crops which are certainly for human consumption and possibly for animal consumption, I want certain definite assurances that these things are going to be noninfective before I will agree to anything along these lines.

MR. D. C. WIGHTON

If the threshold odor number and the residue of the Oldman River can be attributed to the Sugar Refinery factories of Picture Butte and Taber is the Environmental Health Services encouraging, do they feel that the present system of treatment, if any, of their effluent is sufficient, are they encouraging these industries to treat their effluent. They are encouraging Lethbridge and Taber, are they doing the same with these industries?

MR. E. E. KUPCHANKO

As Ted Lawrence said, Lethbridge is putting in secondary treatment at the insistence of the Provincial Board of Health, Department of Environmental Health Services. Similarly the sugar factories are putting in, first of all they have put in the spent lime recovery systems which I inspected and are working exceedingly well and secondly next year they are embarking further on this program

and putting in very fine screening. Similarly with the small town of Taber which has quite a large volume of waste for its size, because they have food processing industries, it is going to this route of spray irrigation. So we are in fact insisting on a clean river down there. I might add in addition to these measures, the Department of Water Resources have negotiated with P.F.R.A. to ensure that we have higher flows in winter, at critical times of the year, times of ice cover and low oxygen levels.

Appendix TREPORT OF TECHNICAL SUBCOMMITTEE NO. 10AIR POLLUTIONSOUR GAS AND OIL INDUSTRY

I regret to inform this meeting that our subcommittee did not hold any meetings during the past year as no new agenda items were submitted and no items from the previous agenda seemed to warrant the calling of a meeting.

Although the activity of our subcommittee was virtually nil I do have a few matters that may be of interest to report and one recommendation to make to the meeting.

Regarding the matters of interest, many of you may know that at the 1970 sitting of the Alberta Legislature amendments were made to The Oil and Gas Conservation Act giving the Board the responsibility and authority to prescribe measures to be taken to control pollution in operations over which the Board has jurisdiction. The Board and its staff has spent many man months this past year on three major aspects of this new responsibility, namely:

1. Regulations have been drafted and put into effect. It is expected these regulations were a good start and it is intended to review them quite frequently for improvement.

2. "Roles" documents have been prepared and discussed with other Government Departments and Agencies setting down the responsibilities of the Board and such Departments having in mind the new legislation. Some of these are now complete but discussions are still continuing with other Departments and it is hoped that all Roles Documents will be completed soon.

3. The Board has had to staff up and to train personnel to perform its new duties. The staffing has largely been completed but I would hazard a guess that several more months will be required before we could call these additional staff properly trained. During the past several months the Board has substantially increased its inspections of field installations for pollution problems and this increase in the frequency of inspections will remain in effect until experience shows the Board that the frequency of inspections should be further increased or decreased.

As Chairman of the Air Pollution Control - Sour Gas and Oil Industry Subcommittee I would like to make a recommendation having regard particularly to myself, but it may also affect the Chairmen of some of the other subcommittees.

In very simple terms, I believe quite strongly that the Chairman of a subcommittee should not be a person who is primarily responsible for the matters that the subject subcommittee was appointed to oversee. To me the reasons for this are obvious and having in mind the Conservation Board's new duties I believe it wrong and in some ways improper for me to continue serving as Chairman of this subcommittee. For these reasons, gentlemen, I wish to resign from the Chairmanship although I would be quite prepared to continue being a member.

A.F. Manyluk
Chairman

Appendix UDISCUSSION ONTECHNICAL SUBCOMMITTEE NO. 10AIR POLLUTIONSOUR GAS AND OIL INDUSTRYPROFESSOR R. W. LONGLEY

I wish to report an experiment that I have made during the past fifteen months really. I have been aware of the problem, but I became much more aware of it at a meeting of this same subcommittee in 1969. At that time people from the Department of Agriculture brought to the subcommittee some evidence in terms of wire and other material that had been corroded because, they felt, of sulphur dioxide, such that they were reporting to the subcommittee that wire which is supposed to last twenty years or longer was being corroded to be useless at the end of five years. The reply as far as whether it was in regard to gas is concerned, it came from the Department of Health, was that inspections had been made by the Department of Health using mobile samplers to go down into the area. They didn't report any further than this until we had a difference of opinion here in that you have agriculture people claiming there was corrosion and the Department of Health people who claimed that according to their reports there was not sufficient sulphur dioxide to explain the corrosion. This made me wonder, and I am afraid I believed the agricultural people, rather than the report from the Department of Health. A year ago I came to the Advisory Board, I spoke on this matter and asked that they would recommend, that the Department of Health get in touch with Suffield Experimental Station officials in order that these people who are very familiar with the problem of air sampling and who know how to sample very efficiently, particularly sulphide dioxide and consult with them concerning this particular problem. In order that we can project what I felt would be a satisfactory and reliable matter of sampling the gases that came up from some of these gas wells. This recommendation was accepted at this particular committee last year. As far as I know, and I have talked with some of my friends from Suffield Experimental Station, there has been some consultation between the Department of Health and Suffield Experimental Station, but not on this matter. They have not taken the recommendation that we made last year to consult with them with regard to how concentrated is the sulphur dioxide around some of these gas plants. Therefore, I feel that this is something which should be done, and it wasn't done.

I also did something else. In March I wrote to the Department of Health and asked if I could get a report on some of the sampling that was done. I asked if I could get it for two instances, I felt that this would not involve a great deal of copying, and in this case I would be able to examine how the sampling was done. The answer I got back indicated that the man who wrote the letter had not read my request properly, or at least if he did, he didn't answer it properly, but the answer said I couldn't get it. I got word through the University Committee which is concerned with pollution to say that these reports become available to the gas plant, but do not become available to the ordinary citizen. This amazed me on two counts. It amazed me on my own account, because I am asked to advise, I have been invited to become a member of this committee, to advise on what could be done. I asked for information

which would help me to understand what is being done, so I could advise properly as a meteorologist what could be done and I am told that I can't have that information. It surprises me too on a second count because here we have farmer A complaining to the Department of Health that a gas plant B is emitting enough pollution to the atmosphere to destroy his fences, his tractors, the paint on his house. The Department of Health then makes an examination, at least they go out and make a report and this report is presented to the gas plant, but the farmer can't have it. It seems to me the Department of Health and the Province of Alberta should be balanced in its examination here and if there is a dispute between two individuals or an individual and a company, and they do work, it seems to me the report should be available to both equally. This was not true in May, according to Mr. Daniels of the University Pollution Committee. Later on Mr. Daniels reported to me that he had consulted with officials of the Cabinet and this had been changed and if you heard the report this morning you found that it had been changed, and you could get information if you wanted to. Note that this was done, some of the prodding in order to have this done came, not from this committee, but from one of the committees on pollution in the province which is not connected with this particular committee. What other representations went to the government I do not know, but as far as I am concerned the change in attitude came from the Edmonton, University of Alberta Pollution Committee, not from the Advisory Committee. So that Mr. Daniels told me in July that I was now going to be able to get the reports that I requested. No reports came to me until October, when I prompted a member of the Department of Health and spoke to him about this and wrote to him about it, again requesting it. As yet I have not got the report, in other words I can't get the information I want in order to examine whether sampling that was done around the gas plants was adequate in terms of meteorology, meteorological observations, and they haven't gone ahead and done anything with regards to other means of determining whether they have an adequate sampling process and I don't believe they have. This is a problem that should have come to the committee of which we are speaking at the present time, but of course there has been nothing to do so we didn't have to have a committee meeting.

MR. A. F. MANYLUK

Mr. Longley, I would just like to make a couple of comments on what you have just said regarding corrosion, it just so happens that our Board had two meetings yesterday regarding corrosion with different committees of the oil industry, in the one case it was regarding a field which we consider to be the worst in the province as far as corrosion goes and as a result of that meeting we fully expect that within two or three weeks, letters including offers of compensation in terms of money will be sent to all of the people affected. In regard to the second meeting it is a committee that has been set up on a permanent basis by C.P.A. to study this matter and look to see if other fields require the same treatment and also to provide for some continuing research on this matter and they are going to keep in close touch and keep us informed on the matter. I am not familiar with any of your other comments in regard to asking for reports.

MR. S. L. DOBKO

You've heard a long list of various things, which I personally apparently have said or have not said, the first item apparently was reported in our monitoring reports that SO_2 was not high enough to cause corrosion, well in the 12-1/2 years I have been involved there I don't think we have ever put out a report that said that. The basis on which standards are set, are

on effects level which is based on vegetation effects. There was no mention whatsoever on corrosion.

Dealing further with the monitoring reports, I am supposed to be a mind reader. The letter came to me and said I want reports from Sulphur plants just east of Calgary or east of Red Deer. East of Red Deer - goes a long ways and as far as I am concerned the only east of Red Deer that I knew about that was of concern to me was the Red Deer Joffrey oil field, there is no sulphur plant, so I am afraid I cannot be a mind reader. East of Red Deer is west of Red Deer as well so let's be more specific. He hasn't received the report as yet. Yes the letter did come through. I think I have had two days to myself in the office since the first of November. I have met with the director of the Defence Research Board at Suffield. I spent a profitable day with him and his immediate administrators and in short, yes they will be willing to do the work. Some green stuff please. It is mentioned the report is not sent to the farmers. For over a year this has been the case. I wish somebody would get the facts straight.

PROFESSOR R. W. LONGLEY

Mr. Chairman, the letter I wrote which Mr. Dobko quotes asked if I might have two reports. It didn't specify what part of Alberta they were to come from, except I suggested that if possible one of them could come from the area east of Lethbridge. It was not specific that I wanted the material from the area east of Lethbridge, it was for any two reports in the province. Mr. Dobko is quoting that letter incorrectly and this is what I meant when I said that the man who wrote the letter in answer hadn't read the letter.

Appendix VREPORT OF TECHNICAL SUBCOMMITTEE NO.13SOIL POLLUTIONACTIVITIES

One meeting of the subcommittee was held. The disposal of animal manures was discussed in depth at this meeting by the committee and resource personnel from the Departments of Agriculture and Health (Animal Industry, Ag. Engineering, Water Resources, Water Pollution and Public Health Inspection). The subcommittee forwarded four recommendations to the chairman following the meeting. They were in part: (i) a preliminary survey of location of feedlots and other confined animal units to determine if there is any soil and water pollution and to include some analyses of water in the vicinity of feedlots; (ii) prepare a publication on disposal of animal manure for farmer use and to include methods, application rates and present regulations; (iii) have a meeting of Public Health Inspectors and Department of Agriculture staff to review programs and common problems, and (iv) request the Department of Education to provide Pollution Information Kits for schools in Alberta. We have not had a reply on their acceptance or action taken. However, this did not deter committee from continuing along the following lines:

1. A preliminary survey of Vermilion River, Medicine Hat River and Willow Creek was conducted by Ag. Engineering Branch of the Alberta Department of Health. Samples were taken twice on the two rivers and three times on Willow Creek during the summer of 1970 immediately after heavy rains. Analyses of water above and below feedlots adjacent to these streams showed little change. Willow Creek showed results that were well below quality standards. The two rivers, that is Vermilion, Medicine Hat, were just below or at the quality standards. No specific source was pin-pointed. Further details can be obtained from the branch personnel mentioned.

2. A publication entitled, "Guide to Animal Waste Disposal" is in final drafting stages for printing and distribution to present and potential farmers and feedlot operators. Considerable difficulty in determining optimum manure disposal quantities was experienced, as no research information was available to the writers applicable to Alberta conditions. The publication outlines measures of good housekeeping and how best to utilize manures as fertilizer.

3. Members of this committee are concerned about the development of super-sized feedlots and the problems associated with them respecting pollution of air, water and soil by improper operation, handling, and storage of wastes. One suggestion is to limit the size of units by a system of licensing and/or zoning. It appears that some form of zoning will be necessary as feedlot and other animal confined housing units become more numerous and larger.

Feedlot problems can be divided into four areas: (i) surface run-off from feedlots; (ii) seepage from under feedlots; (iii) contamination of water through high atmosphere concentrations of ammonia; and (iv) disposal of manure on land. Surface run-off and land disposal will be of concern in Alberta in the future.

4. A publication, "Soil Pollution in Alberta" was prepared by a number of members of this committee to fulfill requests for information from the general public, many of whom were science students. Information of this type was also requested by the Department of Education.

5. Pollution of the environment by industries, agriculture included, can be greatly reduced when certain zoning restrictions are placed on industries which have the capability to pollute, eg. feedlots, poultry farms, piggeries located some distance from water courses and human habitation, new towns. Another form of land pollution should be considered, i.e. locating industries and urban sprawl on low capability or non-agricultural lands.

IN SUMMARY

Members of this committee have noted an increased public concern and awareness. Requests for participation of members in public seminars, panel discussions and conferences has increased considerably. A number of research programs have been instituted which should fill in some of the gaps. However, there is still some heresay, half-truths and in some instances completely false information promoted by "self-styled" experts. It is the type of information which makes effective pollution control very difficult. Our committee feels that the Advisory Committee has at least partially fulfilled the need to improve liaison and communication among the various agencies and disciplines involved in pollution control. We would hope that the new Department of Environmental Improvement will provide for an effective mechanism whereby communication with all disciplines and the general public can be improved and maintained. This will make for more effective pollution control in this province.

A. W. Goettel,
Chairman.

Appendix WDISCUSSION ON REPORT OF TECHNICAL SUBCOMMITTEE NO. 13SOIL POLLUTIONMR. P. E. DUBY

It is my observation that generally speaking the small family farm, especially in a well balanced operation, that there is no problem regarding waste disposal because the waste is used as a fertilizer and there is usually not sufficient of this material to keep up the productivity of the soil, but the large commercial feedlot is another problem. I think this is already a serious problem in Ontario and it may, in the near future, be a problem in Alberta. I don't know whether it is as yet or not. I think if your committee is thinking in terms of licensing large operators of commercial feedlots that possibly some thought should be given to the availability of land for this operator for waste disposal, whether it is controlled, owned and controlled by the operator, or whether it can be arranged for, I think that this should be an item of consideration. There is one other thing that you didn't mention and that is I believe in some large operations these operations are actually creating a traffic problem on some of our highways and I think some consideration should be given to this as well - location, I mean, because of traffic problems.

MR. A. W. GOETTEL

Just in reply to your question, Mr. Duby, just looking at the preliminary work that we did we feel too that just because there are ten small ones along the stream, and they each have 200 cattle, this adds up to the same problem perhaps as one 2,000 animal unit, so I think with respect to location there will have to be some zoning at some time with respect to their location. Your second comment about availability of land, I believe in the regulations at present when an application is made through the planning commission that they have to look at the disposal area to see whether it is adequate and this is one reason for us writing this publication and trying to get this information out to the farming public, to the health people as well, and as Mr. Briggs is trying to get my attention here, there are certainly other reasons for licensing feedlots and our department has thought about this. One is they do have brand inspections and all cattle are branded. In the other case, Department of Agriculture loans money to people to buy feeders. They may not necessarily be in feedlots, but there are numerous reasons for this and I think this is one of them.

MR. W. J. YURKO

I would like to make a request to the chairman of this subcommittee to give very serious consideration to electing to his subcommittee additional people from private enterprises. I would like to indicate that he should give very serious consideration to getting someone from Unifarm, the Cattles Association or the Barley Growers Association or some Conservation Association, possibly the Fish & Game and perhaps even the Alberta Federation of Labour.

MR. A. W. GOETTEL

We will certainly take this into consideration. At our last meeting,

even though we didn't have people from the animal industry field and people such as agricultural engineers who were involved, they were invited to our meeting as resource personnel and membership was considered and we certainly take your comments into consideration. While I have the microphone, I wasn't able to catch the eye of the chairman earlier this afternoon, when the question of stubble burning came up. Mr. Dobko, I believe, made a comment with regard to this and he was right that under the Soil Conservation Act administered through municipalities, a municipality may pass a bylaw to allow the burning of stubble or prohibit it completely, but in most instances they go for the permit system, which doesn't prevent the burning of stubble, but it does allow this person to burn it at an appropriate time and also take into consideration the fact that this is an undesirable practice if continued, and we only allow burning when it is satisfactory from the standpoint of doing the job and also that it may prevent this man from putting land into crop. Furthermore, there is also the Forests Act, which states that farmers or others burning brush piles must have a permit to do so and there are fairly strict restrictions here in burning at an appropriate time. They are concerned, not only with the spreading of fires, but also to maintain visibility in their network of fire towers, so that they can see these fires in the forest regions.

MR. H. LEMBICZ

Mr. Chairman, as a farmer, and if I may say so a good farmer, I have always valued the manure pile as an asset - it's worth of dollars and cents. I have always valued the stubble on my field as an asset that was worth dollars and cents, if I put it back into the soil, because it increased the production of my crop, so I am just a little bit surprised that we consider manure as a problem, but there is a little problem attached to this. Some farmers and some feeders set up their operations in the wrong place and I think this is something that we have to watch very carefully, and there must be regulations on. To say they are not established on stream banks - should be some regulations so this cannot be done. But one thing I might make as a recommendation at this time, that there is quite a number of farmers who have, such as pig lots and some small feeding lots and so forth, land very close to streams, or straddle streams, and there must be some way of removing them from those streams. I think some consideration should be given to ways and means of removing those types of operations from streams that run into rivers and can contaminate our waters.

MR. R. N. BRIGGS

This is true. Under the existing stream pollution regulations, Div. 39, there can be no feedlot operation as such carried on within 50 feet of any water course. The location of the feedlots is now controlled also by the feedlot regulations and there are certain requirements there as far as distances from housing, from your neighbour and where you can locate, etc.

Appendix XREPORT OF TECHNICAL SUBCOMMITTEE NO. 14NOISE

This subcommittee was set up following the acceptance by the A.A.C.P.C. in 1969 of a submission that:

"NOISE IS AN UNWANTED AGENT IN THE ENVIRONMENT
AND AS SUCH MUST BE CONSIDERED TO BE AND
TREATED AS AN ENVIRONMENTAL POLLUTANT."

TERMS OF REFERENCE

The subcommittee should consider the overall matter of noise in relation to the community and report, making such recommendations as it feels necessary to the A.A.C.P.C. meeting in 1970.

MEETINGS

These were held in December, 1969; March, June and September, 1970. The subcommittee finds that:

1. Noise is an environmental pollutant and under certain circumstances can have an adverse effect on the health, comfort and wellbeing of members of the community.
2. Since Provincial Board of Health Regulations already exist to deal with the specific problem of industrial noise (Division 29, Provincial Board of Health Regulations), this particular aspect of the effects of noise should not be reconsidered at this time.
3. Control of noise pollution is a matter of necessity and requires active participation and maximum co-operation from all agencies and from the general public, if the following goals are to be achieved:
 - (i) Noise levels and the duration of exposure of members of the community to the hazard must be controlled.
 - (ii) Wherever practicable, there must be reduction of noise to the "no effect" level.
 - (iii) Control, reduction or elimination of the hazard must be the responsibility of the owner or user of the source - (whichever is applicable).
 - (iv) To ensure maximum effectiveness, there should be early acceptance and introduction of regulatory measures.

The subcommittee recognizes the concern and the activity of certain municipalities in this matter, but considers that such individual action is not sufficient for the purpose. This is a problem which should be considered

on a province-wide basis and any control systems or regulatory measures introduced should be uniform throughout the province.

5. The subcommittee has noted the concern in this matter of the many individuals who have written to it on such diverse topics as powerboats, snowmobiles, music groups, public address systems, etc. and has included these topics in its deliberations.

6. The following specific recommendations are made:

1. That this committee request the Government of Canada to set up legislation requiring all Canadian manufacturers of power operated equipment or machinery capable of producing hazardous or objectionable levels of noise (motor-mowers, chain saws, fans, pumps, outboard motors, etc.) to specify the sound levels emitted by such equipment or machinery under normal operating loads.

2. That the Government of Canada be requested to make this requirement applicable to such equipment or machinery manufactured outside Canada and imported into this country.

3. That since the general public is inadequately informed on the subject of noise and its effects, that there be an educational programme on this subject.

4. That there is a need for a project to measure and compare the sound levels produced by equipment and machinery widely used within the province of Alberta and that the findings be made available to the general public.

5. That detailed attention be given to the special problems which are associated with aircraft noise (military, commercial and private aircraft). In connection with this matter, it is also recommended that a close watch be kept on any proposed, extended or new use of airports and airstrips within the province.

6. That it be recommended to the Government of Canada that supersonic flights over Alberta be prohibited.

7. That since there is a rapidly increasing use of snowmobiles, hydrofoils and power boats, these forms of transport be also covered by any regulatory measures which may be introduced.

While not asked specifically to do so, the subcommittee felt that its considerations would be incomplete if it did not make some suggestions or proposals as to how the aims could be accomplished.

It therefore submits for the consideration of this committee, material which might form the basis of control or regulatory measures, possibly in the form of a model by-law.

The model submitted incorporates the main content of the subcommittee's work in terms of the areas and matters considered.

Where levels have been set down, these are based on what are felt to be possible achievements, capable of attainment within a reasonable period of time. The levels should thus be viewed as ultimate rather than immediate goals.

That ends the committee's report. In terms of the items it considered, and the model it proposes, the measures cover the problems of day-time and night time, standardized methods of measurement, acceptable instrumentation. They are orientated towards the problems of the effect on health, disturbance or annoyance. They include specific permitted levels in terms of highways in relation to speed zones, and in relation to vehicle size. They cover also residential noise levels, daytime and night time, the problems of commercial and industrial premises, daytime and night time and provide some relief in terms of emergency, accidental or pre-planned excessive noise levels.

Dr. C. R. May, Director
Division of Industrial
Health Services

Appendix YDISCUSSION ON REPORT OF TECHNICAL SUBCOMMITTEE NO. 14NOISEMR. D. C. WIGHTON

Dr. May, I wrote you last year concerning the 26 Daimler prototype buses that the City of Edmonton has purchased and the problems arising from the use of such, particularly public problems. You said at that time, in reply to my letter, that there would be an investigation or study made of this. Has this been done?

DR. C. R. MAY

This has, in fact, been done and the results of this have been incorporated in the recommendations made.

MR. D. C. WIGHTON

Is it possible to get ahold of this report?

DR. C. R. MAY

Ultimately, yes.

MR. A. WIGMORE

You mentioned music groups. I take it you are referring to some of these bands that invade the teenage world. Have you ever measured the amount of noise they produce in decibals - how far does this exceed what the human ear can stand?

MR. L. SMITH

We have not made measurements ourselves, but we do know of reports that have been made into such instances. To quote some figures that have been measured, very close to the band has approached 128 decibals, in the center of the dance floor in the region of 110 and in some cases about 40 feet outside the premises it reached 90 decibals.

DR. C. R. MAY

This has to some extent also been taken care of in these proposals. Unfortunately, it is a sort of - which comes first the chicken or the egg. Are they deaf because the noise is loud or is the noise loud because they are deaf and can't hear it. That's the problem to sort out.

DR. E. TOLLEFSON

I am wondering if Dr. May would comment on the recommendation that a flight by supersonic aircraft at supersonic speeds be abolished or should I say not permitted - prohibited in Alberta. In committee meetings on this, I

thought we came up with a slightly different recommendation. I just wondered why this had been changed. Did we find that there are no flights at supersonic speeds over Alberta at the present time by military aircraft and so on?

DR. C. R. MAY

As far as we know, there aren't any, but there are proposals that there should be some and there is an international committee which certainly operates in terms of Europe and some parts of the United States and this piece was inserted to go along with that philosophy that countries do have the ability to control noise levels in terms of aircraft discrimination and one of the problems of supersonic flight is that if you look at a map of Europe, it is almost covered with boom corridors and we thought that this should not be allowed to happen, at least in Alberta. We don't mind if it happens in Toronto or Ottawa, but not in Alberta.

DR. W. BUCK

I would just like to make a comment and an appeal to the parents and the people in this room who are parents of boys who drive motor scooters. Dr. Tollefson brought this up, he said, my little sweetheart took the baffle plates out of his motorscooter, out of the muffler, and I think we, as parents, have a moral responsibility when our youngsters drive these things to make sure that the baffle plates stay in their Yamahas or motorscooters.

Appendix ZREPORT OF TECHNICAL SUBCOMMITTEE NO. 3AIR QUALITY CRITERIA

Dr. David Keys chaired this subcommittee until his retirement a few weeks ago. Whether his onerous duties as chairman contributed to his early retirement, I can't say, we hope not, and I am sure we all thank him for the work he put in.

I was nominated to succeed him, but because I have not yet had the opportunity to attend or call a meeting, I will present only a brief summary report and I hope Mr. Dobko will field any questions.

The subcommittee has held four meetings. The last meeting on May 26th, 1970, discussed a set of proposed Ambient Air Quality Standards based on an air quality criteria literature survey and proposals from the Department of Health.

Air quality standards are the concentration of pollutants which we intend to achieve in the immediate future, but which may fall short of our long-range goals. They prescribe pollutant levels that cannot legally be exceeded during a specific time in a specific place; they indicate possible hazards to health; and they serve as a basis for comparison and necessary corrective action. They are thus an essential part of an effective air pollution control program.

Several minor and two major amendments to the Department's proposals were suggested by the subcommittee: the major ones concerned fluoride (as HF) standards (.001 ppm over 24 hours recommended rather than .004) and SO_2 (0.2 ppm over one hour recommended rather than 0.3 ppm). The reasons for these amendments were that, in the case of fluoride, most of the air pollution regulations in the U.S.A. seem to be advocating this lower level, even though it is basically orientated for very sensitive vegetation; and in the case of SO_2 , the fact that in both Calgary and Edmonton at the present time we are far from approaching the 0.2 ppm level.

It is understood that these proposed standards were presented to the Provincial Board of Health, but they did not accept the major amendments suggested. The standards accepted by the Board have been published and are now available. Nevertheless, I believe it is the duty of the subcommittee to report to the Alberta Advisory Committee on Pollution Control and, therefore, I present its recommendations to you.

J. M. Howell
Chairman

Appendix AADISCUSSION ON REPORT OF TECHNICAL SUBCOMMITTEE NO. 3AIR QUALITY CRITERIAMR. A. F. MANYLUK

I wonder if I could ask one question. I notice you mention a criteria for sulphur dioxide. You also mentioned one for fluorides. I would like your committee's opinion as to whether criteria should vary with the population. In other words, should the criteria be much stricter for an area say nearer Calgary or Edmonton, than it would be for say the extreme north-east part of Alberta.

MR. S. L. DOBKO

I will attempt to answer that in respect to the various things that have gone on in the past. I can only surmise what this question is about. Probably discuss it in private with Mr. Manyluk, but the feeling is that there should be some sort of degradation or grading down of the requirements for sulphur dioxide. Now what Mr. Manyluk says about criteria, I think he rather means standards. The portion of the proposed air quality standards that on table 1 is those levels which we feel are an acceptable level that we are trying to achieve. The second table refers to how you will achieve this and this is a design guideline. In the question of near large urban areas, the basis on which this decision was made was one of relative amounts. Had the particular plant being of a small type, in total sulphur handling capabilities, the point two level would probably have been accepted, but in view of the immensity of the plant, which it was agreed fully to by the senior administration of the particular company, it was felt that it was necessary that a lower guideline be utilized. That's about all I can say on this - if there is any other comment from any of the members of this subcommittee they are welcome to say anything.

MR. H. KRUSCHE

In those meetings with Dr. Keys, we have discussed many times the discrepancy between the general accepted reporting of H_2S and SO_2 , but even in our standards now, it is reported in parts per million and the Department of Health is still recording and reporting in equivalent units of SO_3 and milligrams per day per square centimeters. Now this is impossible to translate from one to another. Now we have to answer many questions from people who are laymen and when we start explaining this, this is something which is used by instrument, they say why do you report it this way, can't you report it in another method. Now I would like to clarify this - it is impossible to translate this one method into another, unless we keep reporting the standard elsewhere in SO_3 equivalent milligrams per 100 square centimeters.

MR. S. L. DOBKO

You are right in saying that you cannot translate from one set of units to another, this apparently has been tried for many years, because of the fact the sulphation candles were originally set up during the 1930's and I believe ever since then there has been an attempt to translate it and it has proven to be quite a chore and is very different for every different

set of circumstances, in fact it seems the only correlation you get is pertinent to only one location. If the question is regarding the levels we obtained in the city of Edmonton, the levels that we do get in say the residential areas, or the downtown areas, are so low that with the most sensitive type of instrument we have, which I might add is sensitive down to .005 parts per million, we would not obtain a single reading for sulphur dioxide in Edmonton. This is proven out by the fact that we utilized this monitor in Calgary which is some three to four times higher on the sulphation levels and considerably higher on the hydrogen sulphide candles, and we did not receive, or did not obtain, a single reading. How you convince the eternal public that these numbers are of no concern, it is a problem, but we feel that we could utilize our continuous monitoring instruments far better in other locations than places we know there is no obtainable reading.

MR. P. E. DUBY

Exactly what are the considerations in establishing air quality criteria. That is, it seems to me at the present time we have insufficient information regarding the effect of the operation of say a sour gas plant on health, on crops, apparently it is admitted that this has some bad effect on metal and paint you know, but there is some contention, and this is a contentious matter I'll admit, there doesn't seem to be sufficient data you know, to know what effect this has on life, plant life or animal life, or human life, and I am wondering how you arrive at a figure for your criteria, what the considerations are. I don't wish to be critical. In no sense of the word am I suggesting that certain operations should be discontinued or abolished or anything like this. I think we have to live with these things, because they are a part of our way of life and nobody is suggesting, at least I'm not, that we go back, we should prohibit, but I think we must have certain controls and regulations and adjustments you know, so we can live with these things.

MR. S. L. DOBKO

I'll make a general comment first and perhaps if Dr. Faith would be good enough to give further details on this, the Air Quality Standards, I know that you are on the Water Quality Criteria Subcommittee and that's what they call them, we call them Air Quality Standards. They are set on the basis of the least concentration having an effect. Now the specific item that you bring up, sulphur dioxide for example, for industrial hygiene levels a human being can work in the concentration of at least five parts per million and if that has been changed, Doctor, you can correct me. He can work in the concentration of five parts per million for eight hours per day, forty hours a week. The level we are allowing on the design basis is 0.2 parts per million in agricultural areas and near urban areas, based on a 30 minute calculated level, which is far below any health effects on human beings. The criteria for effects of sulphur dioxide is governed by effects on vegetation. The levels which do affect vegetation are on a sliding scale, going something like this, 0.3 parts per million for eight hours, 1 part per million for one hour, 1.5 parts per million for 3 minutes, which will effect some types of vegetations. In general, for any of the standards which have been chosen or set down by us or any other control agency are done on the basis of the concentration at which there is an effect upon some form of life, whether it is vegetation, human or animal. One good example is on fluorides, this one is extremely sensitive, or vegetation is extremely sensitive and that's why the .004 and if I am not mistaken for

human life it is somewhere in the range of 1 part per million and you still will have no effect. So this is how the standards are set.

DR. W. A. FAITH

I would like to make one or two comments about the air pollution criteria, air pollution standards, one of the problems, of course, is this fact of the nomenclature business, now we perhaps use a different nomenclature in the states, we call criteria, for instance, the relationships between concentration and some effects upon people, or property or plants. A standard, on the other hand, is not the same thing as criteria, a standard is a regulation passed by some legal authority and we hope that it is based on sound criteria, but we do not use standards and criteria to mean exactly the same thing. Two other points I might mention here, just because I hope that you can avoid them, the whole business of ambient air quality standards in the United States has become quite messed up recently, because we have taken it out of the technical field and put it into the political field, in other words we have public hearings of course in any particular state where somebody adopts standards and too often the body that is setting the standard has a very definite image that they have to protect, that they want to make the public feel that they are keeping them good and they are setting, in some cases, standards which are not obtainable and even putting in, even when they do it they say we know these are not obtainable. For example, the oxidant standards set for Los Angeles, California, at the present time is a tenth of a part per million for an hour and most people realize that you couldn't obtain one tenth of a part per million for an hour all the time in Los Angeles if there weren't any automobiles there at all, and, of course, this is the source, so I think one of the big problems we have been running into recently is something I tried to bring out this morning, when I was speaking about economics, well here I am not speaking about economics, but I am speaking about attainability, the standards certainly should be attainable, that should be one of the things that should be put into it and I want to disagree with Serge here on one item, he said that these standards were based on the least concentration having an effect, I would want to say having a deleterious effect, because you can get effects on some physiological changes, or some psychological changes in people at numbers way below the level that we get in a natural atmosphere and that brings up another problem I would like to mention, that the natural background should be taken into consideration in some of these things. It hasn't been in all cases and this will probably, therefore, call for different numbers in different locations and different population locations, so this business of the same standard all around the world will not stand up very well.

DR. E. TOLLEFSON

I am sorry, Mr. Chairman, to be such a nuisance, but sometimes I have to try and explain some of these things to students. Number 1 item - on this business of deleterious effects, the effects of these pollutants on people, we have here under table 1 on total oxidants that the twenty-four hour standard is .10 parts per million. Now there is a book put out by the American Association for the advancement of science which has a table in it, the book is called Air Preservation incidentally, the table shows that somewhere between 25 and 40% of the people in the San Francisco Bay area show eye irritation effects at this level, and I really question whether we should have a criteria as high as this in this part of the world. Number 2 -

on carbon monoxide we have here an 8 hour average at 15 parts per million. It used to be that California had a 30 part per million criteria and I understand they dropped it to 20 and here we are dropping it down even lower to fifteen. I question whether we can attain that very low level, certainly on the basis of some measurements we made in Calgary, we would have a very rough time meeting that in the downtown area under adverse climatic conditions. The third one is on suspended particulates. We have an average value here of 24 hours, 100 parts, pardon me this is in micrograms per cubic meter, as I remember it Calgary has an average of 125 over the last five years. How would we hope to meet that one?

MR. S. L. DOBKO

The only question I remember is the last one, so I'll start with that one first and I'll think of the others. The total suspended particulates of 100 micrograms is set in the standards. Sure glad you added the average for the year, so this means that there is going to be a considerable number of them well below this level. The higher levels of suspended particulates is a problem because of natural background in the dust bowl of southern Alberta. The carbon monoxide, no your question was why we went lower than the California standard and how you hoped to achieve this, well perhaps using a cliché of some of the members in the criteria, why go to anything higher if it is felt in general that we can attain what we set down, and over an eight hour average I do not know the form of monitoring that you carried out in Calgary, but I have doubts whether you would obtain an eight hour average that is that high. If you do it on a traffic artery, you will get this, but whether this is the correct location to do your monitoring I don't know. On the question of total oxidants, personally I don't have an answer on it. I would like to call on one of my engineers that basically did all the literature search on this for us, perhaps he could give an answer in this respect.

MR. A. SCHULTZE

As outlined, the standards were referred to health effects, plant effects or animal effects. In the oxidants, in the literature that I have surveyed, there had been a trend to go to some lower values for the oxidants and perhaps a slight increase for the increasing trend for the oxidants of nitrogen. For the oxidants of course we do not have the smog problem that perhaps are associated with the warmer climates of California, but basically the level of .1 was on an irritation effect - to people.

DR. J. M. HOWELL

I think there is one important thing that has just arisen from several of the questions that we have heard and perhaps you gathered slight irritation of this subcommittee that the Provincial Board of Health had somewhat over-ruled them before they had had a chance to present their report to this meeting, but I think this is that there is on the one hand an advantage in securing standards which apply over a large area and in this particular case I have no doubt the Provincial Board of Health were trying to get agreement with Saskatchewan and Manitoba. On the other hand, there is much advantage in having a standard that can be applied locally over a very small area and here is another schizophrenia I think.

REPORT OF TECHNICAL SUBCOMMITTEE NO. 4

WATER QUALITY CRITERIA

The Subcommittee on Water Quality Criteria met once during the past year on March 31, 1970. At this meeting the draft of a revised edition of "Surface Water Quality Criteria" was discussed. The proposed draft had been prepared by a committee of the three Prairie Provinces. All the proposed criteria were discussed at the meeting and several amendments were made. Subsequent to the meeting, representatives of the three Provinces met again and the revised edition of "Surface Water Quality Criteria" was published in August, 1970. It is understood that this publication is now the same for all the three Prairie Provinces and this is a most desirable standardization.

We would like to commend the Environmental Health Services Division for the publication of this document which is becoming more complete and worthwhile with each revision.

During the coming year the Subcommittee will meet and will review any changes proposed to the Criteria by the Division or by members of the Subcommittee.

While there are benefits in having the same criteria for the three Prairie Provinces, it will make it more difficult to make revisions and we would hope that liaison between the provinces will continue, so that any proposed revisions can be processed.

At this point, it may be useful to review the definition of criteria set out in our report of last year. Criteria are defined as the yardsticks by which the quality of a body of water can be judged. Hence, criteria are established for the surface waters of the province which indicate a generally acceptable level of water quality. In order to meet these criteria, the Department of Health sets standards which waste discharges must meet before they are permitted to be discharged to the river. These standards are regulations and have the power of enforcement whereas the criteria are a means by which the quality of the river or lake is judged.

We understand that during the past year the Water Pollution Research Committee has not been active. It is suggested that the Water Quality Criteria amalgamate with the Water Pollution Research Subcommittee to cover both fields.

This is the fourth annual meeting of the Alberta Advisory Committee and in view of the pending changes in the Department of Health, it may be opportune at this time for the Subcommittee Chairman to review the terms of reference of the Subcommittee. It is also suggested that all members of the Committee be circularized as to whether they wish to continue on their present subcommittee or if they might wish to change to another subcommittee. Comments from the members on the terms of reference of the various subcommittees would also be useful.

The Subcommittee last year made eight recommendations and we

comment on these as follows:

- (1) The Subcommittee welcomed the Canada War Act. No action was required.
- (2) The Subcommittee recommended that the monitoring of surface waters be extended to include the more important lakes. We understand that this has been done and we recommend that this continue.
- (3) The Subcommittee commended the Environmental Health Services Division for the report on snow dumping and recommended that additional testing be continued for several years. A smaller survey was carried out during the winter of 1969-70 and because of considerable public discussion on this matter, we would suggest that further data be obtained for one or two more years before this project is concluded.
- (4) An extension of the robot monitor programme was recommended and we understand that two units are now in operation. While we recognize that these are expensive units, we would suggest that consideration be given to the installation of a total of six units on the major rivers of the province as follows:

Athabasca River
North Saskatchewan River, below Edmonton
Red Deer River, below the City of Red Deer
Bow River, below Calgary
Oldman River, below Taber
South Saskatchewan River, at the Alberta-Saskatchewan
Border.

- (5) The Committee recommended the installation of holding ponds on industrial discharges and we understand that this is now included in the requirements of the Division.
- (6) The Subcommittee recommended the adoption of the Canadian Drinking Water Standard by the Province and we understand that this has been done.
- (7) Information regarding the banning of the use of D.D.T. adjacent to water courses was recommended to have publicity.
- (8) Concern was expressed regarding the increased number of feed lots. A review of existing legislation to ensure its adequacy and monitoring of surface run-off from these lots is recommended.

The continued publication by the Division of the annual pollution survey reports on the various Provincial rivers is welcomed and these reports fulfill a most valuable and useful function. It is noted that during the past year a biological pollution survey was carried out by the Fish & Wild Life Division of the Department of Lands and Forests. We believe this too to be most worthwhile and recommend that it be continued and expanded as funds permit.

The Subcommittee wishes to express its appreciation to the members of the Environmental Health Services Division for their help in arranging meetings and for their assistance in making the meetings a success.

All of which is respectfully submitted.

Dr. E. T. Tollefson
Vice-Chairman

Appendix ACDISCUSSION ON REPORT OF TECHNICAL SUBCOMMITTEE NO. 4WATER QUALITY CRITERIAMR. W. J. YURKO

I have heard several statements made within the last half hour which please me very much indeed. There has been a considerable amount of confusion in many people's minds between criteria and standards. I was interested in hearing Dr. Faith mention something about ambient standards for ambient criteria, with respect to air and I, as well as he, recognize the confusion that has arisen in the United States since the 1967 Air Quality Act. The same thing applies to water - overall water criteria. I want to indicate that I think that this has been a very noble effort on setting overall water quality criteria for bodies of water within the three prairie provinces, with the possibility that in fact it may become national. I think this has been a very noble effort.

However, there are some very great difficulties associated with this, as I am sure some of you people who have looked into this in considerable depth recognize. There is no legal significance associated with criteria or ambient criteria either in air or water, you cannot enforce these criteria, you simply recognize that something is wrong with either the air or water and you must shut somebody down, or do something with respect to a regulation, to ask somebody else to put in additional equipment. When you set things like this, I am very much concerned that every body of water will then run at its maximum level of pollution and this is what this suggests and perhaps you might comment on this. The second thing, of course, is that this keeps everybody in a state of confusion when the river is, in fact, loaded, or a body of water is, in fact, loaded, because then somebody must make a decision as to who is to reduce his level of say B.O.D. content if these conditions are exceeded, so you have everybody in a state of confusion. Perhaps you can also comment on this aspect of it.

MR. E. E. KUPCHANKO

With respect to the fact that the rivers can be loaded, we get around this by the statement that the values are considered to be the basic quality objectives in surface waters, except for those cases where more stringent objectives are required because of specific use and I can site to you say the water shed areas where we definitely would require a more stringent criteria. As Eric Tollefson mentioned, we have regulations on the effluents, we can regulate the effluents in relation to these standards and at the regulatory agency we can regulate the actual discharge to the receiving water. This is just a yardstick to determine how good your water is.

MR. E. LAWRENCE

The criteria of the levels below which the quality of the water should not go, but it does not mean to say you are going to go down to that level, if your level is already higher than that you may well stay with that. It's a criteria by which you can say this is an acceptable level of pollution in the river, it is an acceptable level for instance which there should be no effect on fish.

MR. E. E. KUPCHANKO

I think it gives an actionable level. If there are parameters that are above these levels, then there definitely is cause for action.

DR. E. T. TOLLEFSON

I have always looked at this business of the criteria - let us take for example B.O.D. if you wish. You don't want to load up a river more than so much, it can only accept so much B.O.D. and consume it without the oxygen level going below the desired criteria. Well by setting this criteria on a river, you can then have a basis for setting standards on each industry and municipality discharging B.O.D. materials into the river, but we would hope that you can still keep within the criteria.

MR. P. E. DUBY

Well I have some concern about this, Mr. Chairman, because you could get into a situation such as this. If you set water quality criteria and relate this to the usage of a stream, you might be putting more, you know, effluents in there than necessary. For instance, I am going to get specific and I don't like to do this. In the Athabasca River, where the Hinton Pulp Mill is situated, I believe, or at least the effluents go in there. I understand that the effluent concentration could be reduced, but is not considered essential, because of the usage of the stream. Yet in a sense if we are concerned at all about the quality of the ocean, the water flows into the ocean, you know, and this contributes, and I am wondering if this is the best way to do this, because I suppose it would be an added expense to reduce the quality of the effluent, I mean to increase the quality of the effluent, but nevertheless it could be done, you know.

DR. E. T. TOLLEFSON

I would like to add one comment there. I'm a member of the mayor's pollution study committee in Calgary and in one of the subcommittee's investigations down there they found the same problem, they felt that one of the industries could have reduced its effluent load considerably and it was a question that they were already meeting the existing criteria so why did they have to bother. Perhaps Mr. Kupchanko would like to comment further on this point.

MR. E. E. KUPCHANKO

Well with reference to the Hinton Pulp Mill, we have the representative here, as far as from the regulatory body I might add that the pulp mill has already spent one and a half million dollars on secondary treatment and they are spending X number of dollars more to try and achieve an optimum amount of treatment, but there is just so far you can go economically and economically survive. For one thing, you cannot remove the color from that waste by reasonable economic means, you can remove it, the technology is there certainly, but they would be just out of business if we asked them to remove the color out of this waste.

DR. E. T. TOLLEFSON

Again it would seem to boil down, I think, to the cost benefits, if you are meeting a reasonable criteria should we really be causing a municipality or an industry to spend more money to improve it if it can be improved. If it's a reasonable quality you see, this is the question.

MR. A. F. MANYLUK

I hope my memory is good, but as you went through the report on your subcommittee I noticed that all of your comments referred to surface water. I was wondering why it does not include sub-surface water that is potable.

MR. E. E. KUPCHANKO

In general sub-surface water that is normally used for drinking comes under the drinking water standards. As far as other uses of sub-surface water, I don't know, maybe Reg Bailey would have some comments or Lloyd Sadler.

MR. A. F. MANYLUK

Well it occurred to me that the Conservation Board makes the oil companies spend a great deal of money protecting these sub-surface water supplies and you're talking about ponds and things, retention ponds for various industries and that sort of thing, we have done a little bit of work on this and we find that these ponds, if not properly constructed, can pollute shallow domestic water supplies and I was wondering if this might not be added to your terms of reference.

MR. E. E. KUPCHANKO

Well certainly out of mind I think this comes under the Water Resources Division, maybe somebody from that Division could make a comment.

MR. R. E. BAILEY

Just to comment on this matter of water quality criteria for ground water, I think at the present time all I can say is that it is being given attention. We recognize that it is something that certainly has to be considered very carefully, so because of the very nature of ground water and its general inaccessibility in relation to surface water, or in comparison with surface water, and although we haven't established anything final as yet, I think all I can say right now, Mr. Chairman, is that it has not escaped our attention, that we are giving it consideration.

MR. A. WIGMORE

Arising from previous questions, it occurred to me that some day we are going to run into quite a problem with planning. If you have a situation similar to Red Deer last year, where they apparently loaded the river to its full capacity and a little beyond, but shall we say theoretically an industry or a community loads a river to its tolerance level and then some other industry wishes to situate downstream, are they going to be restricted

to zero tolerance in their effluent, or somebody going to have to move over and give them room. What kind of a proposition does this pose for us in years to come?

MR. E. E. KUPCHANKO

Well certainly if an industry can reduce its waste to an economical level, then it will be asked to do so and we find this on the Old Man River where you've gone to all the sources and said okay you've got to cut back. Lethbridge has a secondary treatment, the Canadian Sugar Factories are installing additional treatment, Taber has treatment and on it goes and this is the approach we have to take. If it is uneconomical for the industries to install treatment, then we discourage the industry from locating on that river basin.

Appendix ADREPORT OF TECHNICAL SUBCOMMITTEE NO. 2AIR POLLUTION RESEARCH

You can all relax, this isn't going to take very long. The Air Pollution Research Subcommittee had no meetings since the last general meeting. At the time of the last general meeting, I think we indicated that the area for research peculiar to Alberta was very narrow. There could be work done in the analysis of data, morbidity tables and what not. I think we are going to have a report on that type of thing tomorrow from Dr. Smith.

Another area of action by people peculiar to Alberta was the matter of documenting background loads in our cities as far as air pollution was concerned and also in the smaller communities and in the country. This, as you heard from Mr. Dobko's report, is being pursued in the Department of Health as funds permit for the purchase of equipment and the carrying out of these various programs. Beyond that, it was felt in our previous report that the subcommittee should not advocate duplication of effort, duplication of expenditures and research in such areas as very general topics like stack-flow and those which are common to any portion of the world.

Cold weather research could better be done on a national basis by Canada, maybe in collaboration with other northern countries and we felt any major promotion of research in those areas would tend to dilute the overall effort to the detriment of the ultimate goals. We also felt very much along the line that Dr. Tollefson outlined that there was a lot of redundancy between the Air Quality Criteria and the Air Pollution Research Subcommittees and there were certain overlaps in other areas which we felt should be reviewed and which are going to be reviewed I gather at the meeting of the subcommittee chairmen this evening, so on that basis we held no meeting because the chairman had no particular topics and because no topics were brought forth from the committee, so that, gentlemen, is our report.

W. Bannister
Chairman

Appendix AEDISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 2MR. J. W. GRAINGE

I would like to suggest that one place you might put a little research is on some of the organic pollutants that we get around Edmonton from some of the plants down east - east of Edmonton that is. In California there is quite a substantial amount of money devoted each year to investigating the carcinogenic effects of pollutants such as this and various oxidents from automobile emissions, they use chromatography to separate them and study the effects on certain bacteria, by which methods they can identify which are carcinogenic and which are not, and I know that every once in a while somebody asks what are the health effects of these things we smell so strongly, and Serge answers there's none, but I don't think Serge knows.

All I am suggesting is that there should be some research done on some of the organic pollutants we smell so strongly around Edmonton. Serge says they're a pretty low level, but to my nose they are pretty high.

MR. S. L. DOBKO

Well on many occasions my nose says it's pretty high too, but some concentrated effort, and it's not going to fall short of this, has been put into it and when you cannot identify what you are smelling then it is a bit of a problem and perhaps our analytical techniques are going to have to be sharpened to the availability of the technology present right now and until we can identify I don't see how we can get on to any research type of work.

DR. E. T. TOLLEFSON

I would just like to comment, Mr. Chairman, that I would like to have words with Mr. Bannister about the need for research in the air pollution area. Dr. Havlena during the past few months has been making a movie of Calgary's atmosphere, which we hope we will have time enough to show tomorrow afternoon, and we hope it will work out - this is very indicative of the problem that is arising in Calgary and we really don't know the answer and to tell us we don't need research on it, it doesn't make sense to me.

MR. W. BANNISTER

Maybe I wasn't clear enough there. Under no circumstances do we indicate there is no need for research, but rather than Calgary mount a research effort and Edmonton mount a research effort and Saskatoon and Regina, we felt this type of thing could be done, let's face it, there's a limit to the amount of funds, there's a limit to the amount of knowledgeable people that can be put on these various tasks and if we try to make our present people Jacks of all trades, we may get some kind of a job done, but we should encourage, we felt, research on a level that could be done economically across Canada. For instance, you hear a lot of people try to transplant things from the United States, automobile emissions, catalytic

mufflers and this type of thing. Those are fine in those climates, but in this kind of weather we have got to come up with something better, because we don't get to the temperatures at which those things function, so with knowledgeable assistance we feel that we can pick out areas where we can function efficiently because nobody is going to be in that field, but we didn't want to duplicate with our friends in Winnipeg or our friends in Halifax and places like that, but we agree that there is the need for it.

DR. E. T. TOLLEFSON

We have unique conditions here in Canada, with respect to cold weather, I think, and this is one area where we should certainly be putting in an effort. I don't see it coming from the rest of Canada. We, at Calgary, I think have as much of a research effort on the cold weather operation of engines as anywhere in Canada.

MR. W. BANNISTER

I agree, it's not coming from the rest of Canada and we felt this is something we should promote and this is what we recommended last year. It is difficult to know how to promote it without setting up vast efforts.

DR. E. T. TOLLEFSON

No, I don't think we should expect other agencies to be doing it, this may not be done.

Appendix AFREPORT OF TECHNICAL SUB-COMMITTEE NO.1WATER POLLUTION RESEARCH

Gentlemen, my report this morning is going to be very brief. I should start out more with an apology than anything else. You recall at our last meeting, the water pollution research subcommittee, there was a motion passed dissolving the committee, so the committee itself no longer exists. The feeling was that the committee had functioned for some three years and that it had made general recommendations to the government as to how the government might proceed, by way of setting up a research institute or within one of its own departments setting up a research branch. Furthermore, it was felt that the matter of research in various areas might best be handled as a part of other subcommittees, the committee on water quality might well have some matters they would wish to put out for research and the same with the other committees. Along with that there have been the changes you have heard about in the division, the new authorities, so the matter of setting up any kind of permanent research committee was held in abeyance and that is where the matter stands now. I don't know if this matter came up yesterday or not, but this is all I have to report.

Professor P. H. Bouthillier
Chairman

Appendix AGDISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 1WATER POLLUTION RESEARCHMR. J. R. NURSALL

I think it would be interesting at this point to suggest a way in which I think that some research might go. I believe we are now beginning to accumulate sufficient data so that within a period of perhaps two years, it might be possible for us in fact to establish kinds of criteria based on research for certain pollutional parameters that can be used specifically in this area. One of the problems we face here, of course, is that we have very little research dealing with the specific criteria, in relation to the conditions that exist here. Now I'm thinking particularly in terms of criteria for thermal pollution because this is where I have had the most experience, but we have now three years study on Lake Wabamun where there is a very distinct problem, we have a background of study on the North Saskatchewan River, we have the additional input to the North Saskatchewan River of heated water from the new Clover Bar generating plant and I would expect that if we utilize these research areas, and I am thinking now, and this will come as a surprise to you, Pat, but I am thinking now of the people who work with you and the people who work with me, it might be possible to evaluate the effect of the kinds of thermal input to these waters, so that in this period of perhaps two years, we can say that at these latitudes, under the conditions that exist in the Edmonton region, we can establish firmly and on the grounds of good field data the criteria for thermal input, that is to say how warm we can allow water to be before it is put into our lakes and streams. Perhaps you'll have some thoughts on that, Pat, I'm sorry to spring it on you like this, but this is an idea that has been developing in my mind just recently. I think we have the data and the people now to approach this. I am a little worried about applying criteria established elsewhere, under far different conditions to the local scene.

PROFESSOR P. H. BOUTHILLIER

When I mentioned that this committee had disbanded, it was certainly not my intention to indicate that there was not research required and I appreciate the fact that you make the point you make, that we are now getting data in the local areas so we can get solutions to problems that exist here and certainly this is true in other areas. There is some work being done in the irrigation areas using wastes, so we are doing some research and I feel that we will be able to apply some of this data and are applying some of it now, I believe. The one point I felt that the feeling of the committee, going back some time, was that there should probably be a bit more formal arrangement to aid research or to make the research means available. I think this is where Dr. Mohtadi certainly felt that the terms of reference of the committee were aimed that way, rather than dealing with individual items of research, but I think we are, as you point out, coming along in many areas.

MR. R. F. COMSTOCK

I would like to ask whether or not the department itself has funds available now on any type of research in the water pollution field, and also whether or not funds have been made available to any of the universities in Alberta to work on this problem.

MR. E. E. KUPCHANKO

There are a few small grants to the University of Calgary and the University of Alberta. These are in the form of scholarships and this is about the only thing the department has at present. We do some internal research in application to certain laboratory tests, this sort of thing, this is about all the research the department does.

MR. H. LEMBICZ

I believe in regards to research that we are doing most of our research at the present time, especially in regards to our wastes being dumped into our waters. I think our research is headed in that direction. I think we should do more research headed in the direction of using it as a land fertilizer. I don't think we have done nearly enough research in that direction. I believe we should step up research in that direction, because this is the logical place to use the wastes, on the land, the land has the necessary bacteria, fungi and so forth to use most wastes to advantage and certainly the wastes going in the water is of no advantage at any time, so our efforts should be made towards using it on the land. Now I know, it seems that most of the time when this is mentioned there are objections to it because it seems to be distasteful to people to think that they are going to use it on growing crops, yet it has been done in China for hundreds of years, maybe you might say thousands of years, they have been able to use it to an advantage. As a matter of fact, from the information I get the Chinese are considerably cleaner people than we are and we should recognize this fact and they are using it, so I think we should direct our research in that direction, much more could be done. I have heard objections to it, but I never heard one good solid reason why this could not be done yet. I know Dr. Ball mentioned yesterday that it might be infectious disease being spread this way, but to me I can't see where there is any more danger by putting it on the land and putting it in the water and it certainly could be chlorinated if you put it on the land as well as if you put it in the water, so that is no good reason yet. I know it is distasteful to you, but let's direct it in that direction.

MR. E. E. KUPCHANKO

Well I might comment that certainly there is some limit to the amount of research as I mentioned yesterday, about using sewage effluent and potato plant effluent as irrigation. This is being done by the Department of Agriculture - the actual studies are being done by Water Resources Division down in the southern part of the province and again, as I said yesterday, you just can't put any waste on the land because of certain soil conditions. All you do is just block off your soil, rendering it useless. These are the problems that have to be studied.

MR. P. E. DUBY

Mr. Nicolson, further to what Henry has just said, I had a very interesting conversation with a prominent horticulturist who I think some of you may know, Dunc Hargreave, not long ago and he told me of his experience in Paris 20 years ago, that they were using sewage there for fertilizer and not only this, but they were using the garbage in the form of landfills and moving farmers I guess you would call them, people producing vegetables onto these fills and rotating the production of vegetables on these garbage land fills. Now this was a new idea to me you know and a very interesting one and actually this man has pictures of this process and I was hoping to get some of them and bring them up here and I intend to get them, but I think we could do a lot of experimenting in this area. The situation is accelerating and we have got the stuff to dispose of and if we can use it to advantage I think we would be well advised to do a little experimenting.

PROFESSOR P. H. BOUTHILLIER

I could just comment on that - no doubt in my mind and I agree with the gentleman that reuse is one of the best ultimate ways of curing a problem or not having it occur in the first place as far as river pollution is concerned. And all of these methods have been proven, it is just a straight matter of economics and I think some day it will occur here, that is we have sewage sludge now that is in the best form to haul out to land, and we can't even get rid of the material that is easily transportable. I think it is entirely a matter of time until these attain some value, it is a matter of economics primarily.

MR. D. BROADFOOT

I have a question to ask and a statement to make. I better make the statement first. As far as this matter of using sewage effluent for irrigation, if any of you are interested the small town of Redcliffe has been using it for about ten years now and it has been quite successful. The only difficulty, as you say, is that there is a certain feeling about it and after seeing the way the frogs and the ducks thrive on the sewage pond, I have stopped eating wild duck. This was tried in the Okanagan, on the Indian Reserve they attempted to use the sewage effluent on the land and evidently it was not a success and they have now abandoned this attempt and they are going to other sewage treatment. It is also used in Lake Tahoe in the United States and they abandoned I understand their first attempt, but have since then exported the final sewage effluent to the neighbouring state for use as irrigation water, so this is being done and I think the research that has been done in both B.C. and the States would be of great value to the committee and probably could be obtained without too much difficulty and that brings me to my question. The research on water pollution is being held in abeyance and it includes, I presume, all this using effluent for irrigation and so on, but who is going to do the research. Did this committee intend to do it themselves or are they going to hire the universities to do it, was the government asked to supply the money to have the universities do it, were they going to do it themselves. Who is going to be responsible for this. I think it would be a good idea to make this fully clear to the group that is here.

PROFESSOR P. H. BOUTHILLIER

This very last statement is just what I believe our committee was getting at. This was a volunteer committee, certainly they took the job seriously, but let's face it, they were not able to spend too much time on it. Our recommendations to the government were to set up some permanent section or research institute that could deal with water pollution problems on a continuous basis, have some funding and so on and this I think was the feeling of the committee. I think this answers your last question. The other from the government point of view, I can see possibly some, these are my own opinions, some reluctance to start a large scale new research center. This matter of pollution control, pollution research, it can be divided up so many ways. How do you go about it? Is it a Federal responsibility? Are we duplicating areas of research. If you give research funds to the university are you spending money mostly for research or for training people in that area? It's a very complex question and we discussed this for hours, but I think your final question is just what we were trying to arrive at when the committee disbanded and put it back in the government's hands to make some decision on.

MR. D. C. WIGHTON

I do know a Dr. Netolitski at Camrose College who is indeed crying out for some work to do during the summer. This would not cost anything in regard to salary. Perhaps a slight cost of materials and I am particularly thinking of research in the Driedmeat Lake area, Biology Department.

MR. W. YURKO

I would like to hear Dr. Bouthillier's remarks directed with respect to clarifying for me this aspect of this question of research. Is it the funding that is really the problem, do we have the institutions, or sufficient number of institutions and channels of research in Alberta such that any amount or degree of work could be done if the funding were available. So my question is really, is the funding the problem or is the fact that we don't have the appropriate type of institutions available in Alberta to do the research work that is necessary?

PROFESSOR P. H. BOUTHILLIER

Well, I think it's some of both. Certainly the government has been quite good in providing funds for certain research areas or topics and they have some scholarships available, but the very fact you point out, there is no institute, no one place, to do this. I think there has to be some leadership, some government section or department or an institute who will head this up if you really want to make it go. This is the point again as I said before, I think this is what has to be done if we really want to do some large amount of worthwhile research in water pollution. Does this answer your question? For example, the committee suggested various arrangements whereby industry would share cost programs for research. After all this is another idea, if you want research done in oil refineries, who is best fitted to do it but those people in that area. There could be joint research ventures, there were several recommendations made in this regard, so that if you have a variety of methods, but I think that you should have one department or one section of the control authority that is research minded I believe.

MR. D. BROADFOOT

You mention this difficulty in getting the research done. I was under the impression that the new Canada Water Act made special provisions for research and I was wondering if one of the departmental people here could comment on that. Also I think that under the new Prairie Provinces Water Board, a statement there somewhere that they can do research and I was wondering if these might be the people we should be contacting and asking for the research, rather than doing it from a committee from here.

MR. E. E. KUPCHANKO

You are certainly right, under the terms of the Canada Water Act there are provisions for research. Now, as you appreciate, the Canada Water Act is fairly new and parts of it must be implemented and there is this lag in implementing the sections of the Canada Water Act. Now the Canada Water Act did not state at what level the research would be conducted. Now there are fairly large programs at the Federal level that are being now geared up.

MR. D. BROADFOOT

This is what I wanted to make clear. The Federal Government I think has made, I can't remember the clause, but the Federal Government is made responsible for research and data.

MR. E. E. KUPCHANKO

Right. They are made responsible, but I don't think the terms of the Canada Water Act indicated that funds would be available at a local level.

MR. D. BROADFOOT

No, it won't be local, but should we not, as this committee here, ask the Federal Government for this particular research?

PROFESSOR P. H. BOUTHILLIER

This is much the point I made a moment ago, there has to be a decision of who is going to do this and with what funds and this is why it is so complex. I think this is why the government of Alberta, Department of Health, has not moved quickly in this area. I would think under the Canada Water Act, these would be joint programs and certainly Energy Mines & Resources is backing a lot of research. They are doing some now, the inland fisheries, there is considerable amount being done, but in direct answer to your question, I don't know of any local research being done with funds under this Canada Water Act.

MR. D. BROADFOOT

In other words, even though they are responsible for it, the Federal Government say they are responsible for it, there has been no move as yet to do anything.

PROFESSOR P. H. BOUTHILLIER

I think this is true with the whole Act. I think it is going to take a long time to grab hold. It might be two, three, four years before they really get areas of research established and so on, this is my opinion.

MR. D. BROADFOOT

Now under this three province agreement that we have in the Prairie Provinces Water Board, if Mr. Bailey is here perhaps he could tell us if they intend to do any research through that Board. They also have that responsibility, I understand from the terms of the agreement.

MR. E. E. KUPCHANKO

Well I might comment on that because I was just looking at it the other day and certainly there are provisions for research and there are provisions that certain provinces should do monitoring, but again there is a lag in actually getting this thing done.

MR. R. BAILEY

This newly constituted Prairie Provinces Water Board has not been actually in effect for too long. The Water Board itself, I think as everybody knows, has been in existence for some many years, but it was newly constituted a short time ago and we have only had about three or four meetings and these meetings have been devoted to trying to identify our role under our new terms of reference. We recognize this aspect of research, but at the present time we have not identified any specific areas of research. In the area of pollution the Board feels we should start with a role of observing and monitoring the methods of determining pollution levels with respect to the Western region, that is the three prairie provinces and we feel that we should observe these levels and the methods of monitoring, the types of parameters that are being measured and if, in the opinion of the Board, there is room for improvement, or some deficiency or gaps or something like this, then the Board may see fit to recommend to the respective governments as to what improvements they would suggest. Now, as I say, we are just getting into this. The first step is to take an inventory of what is being done. We are just now in the process of making this inventory, so it will be some time before the Board will find itself in the position to consider research, as I think you are talking about here this morning, projects and at this time, at this point, I really couldn't say or predict what action the Board may take. The Board has no facilities, as such, at the moment. The Board is made up of representatives from the three prairie provinces and the Federal Government and that is all. Now we are working on setting up a secretariat and we are working on trying to make some provision for budgets and so on. What this will all lead to is difficult to determine at this time, but I think I would be safe in saying it will be a while before the Board can actually even consider looking at specific areas of actual physical research. While I am on my feet, Mr. Chairman, there are a couple of remarks I think I could make pertinent to what is being said this morning. Some reference has been made to irrigation with sewage effluent. Water Resources Division is conducting research on this possibility. We have observed with considerable interest this idea of using sewage effluent for irrigation. We feel that it is very important to determine before we sort of endorse this practice to determine what effects, long-range effects using sewage effluent might have

with respect to soil quality and the quality of the crops that might be grown through this process. The immediate effects appear to be beneficial in places where this has been used, of course we have no idea what the long-range effects might be and we felt that it was pretty important to find these out before we sort of put a stamp of approval on this kind of use for water, so this work is going on and we have several co-operative arrangements made with municipalities, individual farmers and so on, where we are actually monitoring, experimenting the use of sewage effluent for irrigation purposes.

The research end of the Canada Water Act I think will find although the Federal Government have indicated that they would have the authority to undertake research in Canada, I believe that if it were going to get down to something of a regional or a local level, it would have to be through a joint agreement with the provinces and then I think too we can't overlook that clause in the Canada Water Act which appears quite frequently. It applies to those things which are of a national interest - whatever that might be. Sometimes it is a little difficult to identify. However, I think the Federal Government would have to be convinced that whatever particular research project, that any province might want to undertake jointly with the Federal Government, would have to be in the National interest.

Appendix AHREPORT OF TECHNICAL SUBCOMMITTEE NO. 12INFORMATION AND EDUCATION

The above subcommittee met formally for the first time this year just prior to this annual meeting of the whole Advisory Committee. This was for the purpose of assessing its active membership, and to consider the work in its field that had been carried on during the past year.

The subcommittee has noted the past proposals by several subcommittees that greater availability of pollution information be made available and distributed to the general public, and to specific areas of interest. One recommendation dealt with preparation of a publication that would encompass generally the broad field of pollution and be acceptable for widespread distribution. This has been accomplished with the booklet you have, prepared by the Publicity Bureau in co-operation with the Environmental Health Division of the Department of Health.

In addition, another publication that drew widespread interest was an issue of the former government publication Within Our Borders, devoted almost entirely to pollution. Many copies of this issue were distributed to schools on special request.

Several previous recommendations by subcommittees dealt with greater emphasis on pollution education in the schools. This has been recognized and adjustments are being made in many areas of the curriculum to deal specifically with pollution and environmental preservation. In addition the Department of Education has prepared a bibliography, listing sources of pollution material, as teacher-help reference. It is this committee's understanding that new texts for several school subjects are being printed in which pollution matters are included.

Your subcommittee recognizes that the more good information is distributed, the better it is for all concerned. However, there are economic limits to which it is possible to go. A recent proposal that special "Pollution Information Kits" be made available to all students of all grades in Alberta was considered by your committee. Estimating conservatively that such a kit would cost about 50 cents, supplying the 414,000 students would involve a first-year expenditure of \$207,000.

It is the opinion of this committee that this sum could be used to better advantage.

The Environmental Health Division of the Department of Health is, as you know, circulating subcommittee reports and also a newsletter to advisory committee members and generally making this and other information available to the public on request.

Many of this Advisory Committee are conscious of the increased exposure in public media of matters dealing with pollution. Television and radio have taken considerable time and trouble to expand programming in this area. The committee has encouraged this and we hope to encourage even greater

Appendix AIDISCUSSION ONREPORT OF TECHNICAL SUBCOMMITTEE NO. 12INFORMATION AND EDUCATIONPROFESSOR P. H. BOUTHILLIER

Just one brief question, if I might. Are there any plans to replace the publication from the Lands & Forest and Wildlife Within our Borders by some other publication?

MR. H. E. MARTIN

I think, or I would hope, that all of you have received the two trial copies of Alberta Land for Living, which was distributed freely to all the households in Alberta and it is the government's intention to continue with the publication of this periodical and in there I would hope that there would be extensive support for pollution information.

MR. P. E. DUBY

There is a very definite feeling in the rural areas that the work of the Alberta Advisory Committee on pollution control should be made known to the farmers and rural people and just as an example of this, at the annual meeting of Unifarm, which takes place next month between the 8th and 11th, there is a resolution coming before this organization requesting that this be made available - this information be made available to rural people and I don't have the wording of the resolution at the present, but this is what it amounts to, and in addition to this I might say, as far as I am concerned personally, I am not a member of this specific committee, it is known in rural areas that I am a member of the Alberta Advisory Committee on pollution control and I am often asked to attend rural meetings, and inform them as to what we are doing and what is going on regarding pollution. In fact yesterday I was asked to appear in Medicine Hat at a public meeting and speak to them there, but this conflicted with my being here, because the 25th was when they wanted me and this happens all the time. I have done quite a bit of this type of work. I don't know whether I really have the authority to do it because I am not a member of your committee, but so far no one has offered to pay my expenses, I'm paying this out of my own pocket and actually I have attended possibly twenty or thirty meetings of this type since our last annual meeting and it runs into quite a bit of expense. And so far, well, I have no authority to bill the Minister, you know, unless he is authorized for this type of work. I just thought I'd call it to your attention. I don't know how is the best way to get this information out, but there is a definite need for it, whether it should be in the form of publications or directly by members of this committee speaking to groups in the country.

MR. H. E. MARTIN

I certainly don't want to get involved in any discussion about sharing of costs or whatnot, I have enough trouble with my own expense accounts much less sponsoring others. I am sure that this is worthy of

discussion in the department and some action might well be taken. I would like to say here, relative to going around talking to groups, I would like to commend highly the members of the Environmental Health Division and the Deputy Minister of the Department of Health, because I know that they have spent many days on the road and spent many hours attending various information meetings in rural areas and urban areas sitting as panels and exposing themselves to some pretty sharp questions for which there may or may not be answers, but they have certainly done a wonderful job in meeting the needs as well as they can in the time that is available in a given day.

MR. H. LEMBICZ

I am not so sure whether I am speaking as a member of this committee, I don't think I am, don't see I am on the list, but I was on the list and some way I missed that meeting because I was down with the flu and I was just recovering. It was about 30 below zero and I didn't get to the meeting. I am not on the list anymore, but this does not bother me at all, because I am out in the field, as Mr. Duby says, working anyway. But it might interest you how I go about my work. I do talk to quite a few people at meetings and a lot of these groups are ladies' groups and I appreciate this very much because they are very important people. But it might interest you as to how I go about trying to get the message across, because deep down I feel that the basic problem is mankind and their filthy habits. Now if you want to quarrel with me about this, I'll quarrel with you at coffee time, but this is the basic problem we have, is the filthy habits of mankind and to arrive at getting the attention of people I use this tactic of - well I'll tell you a little story about the farmer who had a mule and he wanted this mule to pull a load and no matter how he encouraged this mule to go he just stood there with his ears back and he didn't do anything about it. His neighbour was along with this farmer, as the farmer walked back to the shed and he came back with a 2x4 and he hauled off and he hit the mule over the head and knocked him down and the mule got up again and the farmer said to him - go - get up - and away the mule went and the neighbour said isn't that a bit rough way to treat that mule. Yes, but the farmer said you've got to get their attention before you can get results. And this is the way I think I go about it for this reason, I fall into the class the Minister mentioned yesterday of being schizophrenic and he is quite right. I believe I take that course. I might mention while I'm saying that, that there is a chance that other people might be schizophrenic in another manner and that is tearing up their God given environment to get all the natural resources out of it, this could be just as bad. So I think the two of them will balance up alright. But first of all you must get the attention of people. I feel that when you go out to talk to people, you might have to go overboard a little bit to get the attention of people and then drive home your message, the basic problem is mankind itself and their filthy habits and put them on the spot - what are you doing about it as individuals? I talked to a large number of women's groups and they are very important people, with all these gentlemen around here I could get in a lot of trouble. I think they are more important in regards to pollution control than even the men are, because they are the mothers of mankind and they make the greatest effort towards training their children and what the children do from now on will depend on what the parents teach them, especially the mothers and this is a point that I tried to get across to people, that if we are going to have pollution control, the thinking of our people has got to change in the future or else we're not going to have too much pollution control in the future unless people are thinking differently, behaving differently than they are at the

present time and this is the message I think we must get to the people, that they are the polluters and they are going to have to change their way, their behaviour in the future.

I think this is the information we must get out, along with other information that comes from the different departments, films would be a very good idea and this little booklet that came out helps considerably to get that message across to people. This is what's got to be done.

Appendix AJREPORT OF TECHNICAL SUBCOMMITTEE NO.11WATER POLLUTION CONTROLGAS AND OIL INDUSTRY, DRILLING AND PRODUCTION

At the last meeting of the Alberta Advisory Committee on Pollution Control, Subcommittee No. 11 reported that its task was largely completed. The main recommendation, made about a year ago, proposed the creation by statute of a full-time Provincial Pollution Control Board and suggested powers and functions for such a central control authority. Our Subcommittee congratulates the Government on its recent action in the enactment of the Environment Conservation Act which includes provision for the establishment of an Environment Conservation Authority. This Act, Bill 52, was assented to on April 15th, 1970, and is fully in line with, but predictably an improvement on, the basic recommendation made by Subcommittee No. 11.

Our Subcommittee also fully supports the recent action of the Government whereby centralization of the control of pollution as it relates to the petroleum industry has been placed in the capable hands of the Oil and Gas Conservation Board, a group thoroughly familiar with all phases of oil industry operations, with a long history of tough but fair policing and enforcing activities in all matters within its terms of reference.

Subcommittee No. 11 plans no immediate action at this time unless called on by the newly formed Environment Conservation Authority for any assistance it may provide to the Authority

ZAMA LAKE - OIL DEVELOPMENT IN A SENSITIVE ECOLOGICAL ENVIRONMENT

The Zama-Hay Lakes area is located in the extreme northwestern corner of Alberta. It is North America's largest breeding and staging area for ducks and geese, obviously a most difficult place to contemplate mineral resource development.

Shortly after the first oil discovery in the Rainbow area in 1965 it became apparent that the formations that had proven productive in Rainbow might also be productive in the general area in which the lakes are located and in the specific area of the lakes themselves.

Some of the same physical features of the lakes (mainly very shallow water and variable flooded area) that attracted the high population of migratory birds helped make it feasible to consider exploring and developing the lake area.

The flooded area varies dramatically with climatic season. This contributes to an abundance of food, and makes the area attractive for both nesting and staging. On the other hand, the shallow water freezes to bottom in winter, providing easy access to the lake for petroleum exploration and development activity. However, the periodic presence of the migratory birds made it apparent that special emphasis had to be placed on prevention and

control of any contamination. The shallow water and variable flood required that the plan and facilities for such prevention and control be amphibious in nature.

Later today, Mr. Bohme of the Oil and Gas Conservation Board will be describing the special regulatory requirements that were developed jointly by the Board, other government departments and agencies, and industry, to ensure protection of the environment.

As a representative of industry and of Shell Canada, I would like to emphasize four points in this brief review:

- 1) A major pre-planning effort was required on the part of government and industry, well in advance of each phase of exploration and development, to achieve the objective of timely implementation of realistic and effective rules to protect the natural environment.
- 2) The kind of co-operative effort which we have come to expect in Alberta, by all the government agencies involved with the problem, and by industry, led to achievement of this objective. It wasn't easy for any of the groups involved, but the results were fair and effective.
- 3) While my company was not necessarily in agreement with some of the regulatory requirements, we fully accepted them because we had the opportunity to contribute our points of view, and because the requirements were known to us sufficiently early to be included in our business planning.
- 4) We, as a segment of a resource-based industry, accept as a part of the cost of responsible conduct of our business, the expense that has been added to exploring and developing oil reserves in the Zama Lake area by the special measures that we have had to take to protect the environment.

Shell Canada acquired the right to explore the lands underlying Zama Lake in 1966. We immediately began to define the environmental problems associated with conducting an exploration and development drilling program, should our seismic surveys be encouraging. These plans were reviewed with all interested government departments and agencies who themselves had undertaken a similar effort. This planning phase culminated in the fall of 1967 when special requirements were finalized by the Conservation Board and made a condition in the granting of each exploratory drilling license.

We drilled two exploratory wells in the winter of 1967-68 - both dry holes. In the meanwhile, our own planning and joint planning with the government agencies was focused on problems associated with development drilling and oil producing operations. During this phase, communications between industry and government agencies was greatly simplified because the Oil and Gas Conservation Board assumed a co-ordinating role for all interested government bodies.

Our 1968-69 winter exploratory drilling program resulted in three discoveries, wells capable of oil production on a commercial scale.

The second planning phase culminated in the Conservation Board issuing special requirements applicable to development drilling, production and general operations in the area, almost six months in advance of the

earliest possible development drilling on the lake in the winter of 1969-70.

Shell conducted a development drilling program on the lake last winter and before spring break-up constructed permanent production facilities. Concurrently with this program, we finalized our pollution control plan for a producing rather than an exploration operation and acquired the equipment necessary to carry out this plan. Approval by the Board was given prior to the wells being placed on production in March of this year. This little story of a resource development project, successfully accomplished under unusually tough environmental conditions, is a classic example, in the sense that it is not unusual in Alberta, of cooperative effort and understanding between government and industry.

I am sure that it will be no news to anyone in this audience, that planning by government and industry to prevent potential problems is an every-day part of our business, whether the problems are ecological or otherwise, though some, including myself, might argue that we could be better at it than we are. Now, how do we do it better? I wish the answer were a simple one. While we, as a company, and industry as a whole agree that regulations are necessary and in any case are with us in ever increasing numbers, we are convinced that significant improvement in our effectiveness in preserving the environment (or improvement in anything else, for that matter) is highly dependent on three basic factors: these are the attitudes, interest and training of all of our staff, whether they be managerial, technical or operating. And to bring this about, we spend a very considerable amount of time, effort and money in my company, as in any company that expects to be in this business very long, to ensure that our people at all levels of the organization, are aware of the influence that their actions can have on the environment. And I want to finish by saying that we, in another cooperative project with government, pray for a little assist from on high to keep the inevitable accidents from being big ones.

William L. Grossman
Chairman

Appendix AKREPORT ON ASSESSMENT OF AIRCRAFT NOISE

You will recall at the meeting of this committee last year that a request was made for a survey of noise and a report on its effect on communities in the vicinity of airports in Alberta. In making this presentation I would ask that you keep in mind the fact that the text has been kept as brief as possible in order to obtain maximum value from the charts and diagrams as shown. We are attempting a 2D graphic presentation, not 3D unfortunately. The methods of evaluation used involve a term with which you may not be familiar, this is the PND - Perceived Noise Decibal Level and those four words - Perceived noise decibal level occur quite frequently through this presentation and they are not the easiest words to string off in a hurry, so I'll just use the abbreviation PNDB - The perceived noise decibal level is not the noise emitted at source, but the noise level which is perceived by an observer stationed at the point of interest. The table on the left-hand side of the sheets which are on the table in front of you, will give you the relationship of this unit to the DBA level which is the usual method used in measuring noise. We have assembled certain information and compiled maps which you will see on the slides and it was first necessary to do this to determine the noise contour of - the noisiest type of aircraft using the particular airport. These contours were set down on the maps in relation to each runway, the runways I am speaking of now are the International Airport in Edmonton, I am sorry the Industrial Airport in Edmonton, the Nisku International Airport and the Calgary Airport. These contours were set down on the maps in relation to each runway in two opposing directions to take account of two possible takeoff and landing situations. It was also decided that although one runway may be used more frequently than others, the noise pattern should be applied to all runways on the same map. This was considered necessary in order to determine the worst condition type situation and cover extended usage for the future and any emergency situations which might arise. You are thus about to be presented with the worst possible conditions picture for the Edmonton Industrial Airport, International Airport and the Calgary Airport. Now the first three slides that we are going to show, because of the difficulties of showing them, you will be able to see them but you will not be able to read them. We have, however, the actual contours which we will pass around for you to look at individually later on.

This first slide is a noise contour for the Boeing B737 - this is the air bus between Edmonton and Calgary. Commencing from the center you will note the PNDB levels which start at 115 perceived noise decibals and diminishing in five PNDB steps 110, 105, 100, 95 to the periphery of the pattern.

Slide #2 the contours for a DC8 fueled for a flight of less than 2,000 miles and Slide #3 shows the same aircraft but clearly demonstrates the increased size of the pattern when the aircraft is fueled for flight in excess of 2,000 miles. Taking as an example a 3-runway airport, and using the five contour lines of the aircraft of interest, if we had tried to plot the contour lines - each of the five lines - you end up with a hopeless jumble so it was decided to indicate separately on each map the total area enclosed by the separate contour lines, 115 DNB, 110, 105, 100 and 95. As individuals, your appreciation of the problem at this time will be totally

dependent on the frequency of use of each runway and the type of aircraft involved in a particular incident. Those who live on the top floor of a high-rise apartment block, situated in the main access, will no doubt be convinced already that only one runway is ever used. In the three series of slides you will now see, the contours commence with those of the highest PNDB continued through in descending order of PNDB level. The areas affected are smallest with the highest PNDB and largest with the lowest. With each slide series, I will give you the name of the type of aircraft to which the patterns refer. You will also be given the measurements of the long axis and the width of each segment.

The next five slides show the noise pattern of a B737 taking off from the Edmonton Industrial airport - the first slide 115 PNDB - it is 2-3/4 miles long and 1/4 mile wide. The second slide 110 PNDB - it's four miles long and 1/2 mile wide. The third slide 105 PNDB is 5-3/4 miles long and 3/4 miles wide. The fourth slide 100 PNDB - 8 miles long and 1 mile wide. And the fifth slide 95 PNDB - 11 miles long and 1-1/2 miles wide. In connection with this last slide, the one that is on now, you are asked to take particular note of the lower right-hand corner, where you will see the encroachment of the 95 PNDB contour of a DC8 with full load taking off in a north-easterly direction from the International Airport at Nisku. The next series of slides are the International Airport at Nisku, here again you should note the encroachment of the pattern on the area around the south-east of Edmonton. The next slide DC8 115 PNDB, the pattern is 6 miles long and 1/2 mile wide. The next slide 110 PNDB, 7-3/4 miles long and 3/4 miles wide. Next slide 105 PNDB - 10-1/4 miles long and 1 mile wide. Next slide 100 PNDB is 15 miles long and 1-1/4 miles wide. Last, 95 PNDB is 18-1/2 miles long and 2 miles wide.

Now for the Calgary airport we are showing a pattern for the DC8 because the Edmonton Industrial Airport is not big enough to receive a DC8, so it is academic in terms of Edmonton, but the DC8 is the noisiest of the planes, so it gives a picture in Calgary. The first slide 115 PNDB, 6 miles long and 1/2 mile wide. Second, 110 PNDB, 7-3/4 miles long and 3/4 miles wide. Next slide 105 PNDB - 10-1/4 miles long and 1 mile wide. Next 100 PNDB 15 miles long and 1-1/4 miles wide. Final slide, 95 PNDB 18-1/2 miles long and 2 miles wide. At this airport the most commonly used runway for the large aircraft is that which runs from north to south. Now then, subject to the availability of contour information, similar pictures can be made up for all airports and airstrips. What you have seen, and I repeat, the worst conditions pictured for the three airports under consideration, this is the objective pattern. On considering the effects on individuals, this involves subjects of observation. The effect will be related to many factors and it is impossible to generalize. Basically, the effect will be related to the PNDB taken in conjunction with the number of incidents of takeoff or landing in any given period of time. Below 85 PNDB, the subject's response is variable, 85 PNDB there would appear to be a linear relationship between the effect and the noise number index. The broad picture, as given in the table on noise measurement sheet, which is on your table, labelled subjective intrusion and noise, the only truly consistent finding is that at 80 perceived noise decibels 98% of the population agrees that the environment is quiet and there is no intrusion.

In concluding this presentation, I should perhaps explain just how the information was obtained. We did plan a survey as we were directed to last fall. We found that the cost would be in the region of seventy to eighty

thousand dollars. I was unable to arrive at this sum of money and knowing that the information was available, it seemed to us that this procedure we have presented would fill the bill unless, I can't imagine what other information could be added to it, so what we did was seek the help of the Federal Department of Transport which was freely forthcoming. I contacted my opposite number which is Mr. O. G. Stoner, Deputy Minister and through their help, and so on, this presentation was compiled. I think I should tell you that Dr. May and members of his division and committee had the prime hand in preparing the presentation and probably this - not probably - this is the first time in my life I have had a speech writer and it is an experience.

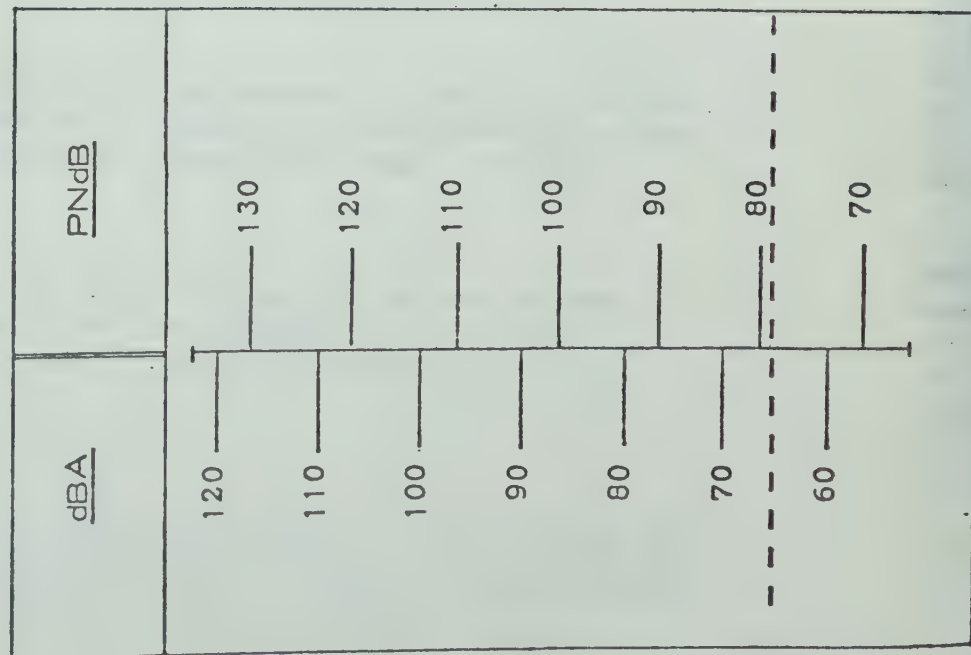
Dr. P. B. Rose
Deputy Minister of Health

PERCEIVED NOISE

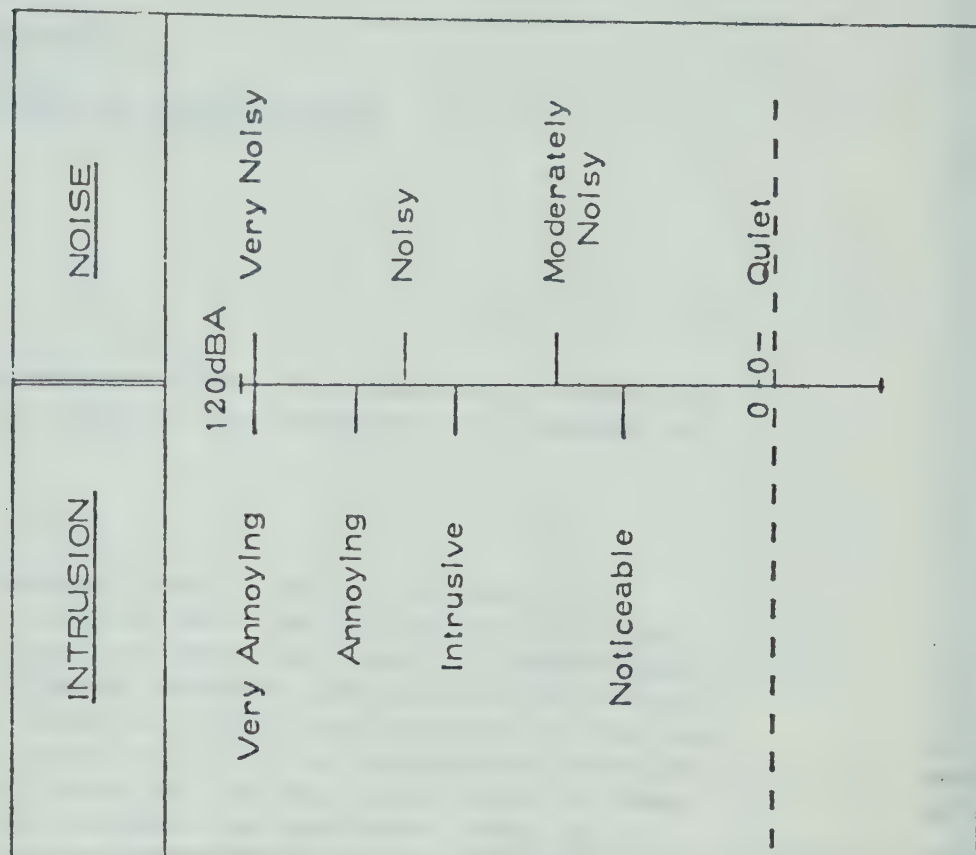
Overall sound pressure levels measured by a sound level meter do not correlate well with judgments of noisiness in relation to aircraft noise. To achieve a more precise numerical description of noisiness, a method of computation from octave band levels was involved completely analogous to that of loudness level calculations. This computation gives more emphasis to the high frequency and is referred to as the perceived noise level, the unit being the perceived noise decibel (PNdB). This scale of perceived noise level as a measure of the noisiness or annoyance value of noises has proved of great value in specification of the noise experienced by a community from jet aircraft in flight or on the ground and the method of calculation using octave bands of noise, has now been internationally accepted.

NOISE MEASUREMENT

OBJECTIVE



SUBJECTIVE



Appendix ALDISCUSSION OFREPORT ON ASSESSMENT OF AIRCRAFT NOISEMR. J. GRAINGE

What does DBA mean?

DR. P. B. ROSE

Gentlemen, I am only the mouthpiece for this exercise, I would not presume to be the expert, so that Dr. May, who is the expert, will answer any questions you have.

DR. C. R. MAY

The normal or the old fashioned term of decibal is really an engineering laboratory term and the term DBA was used to produce something that was physiological and is more near the sound level which is appreciated by the human ear. It is slightly different from the old term decibal. Equally, when talking in terms of perceived noise, this is a psychological term if you like to make a distinction between the three. One is an engineering term, the other is a physiological one and the other is a psychological one. The DBA is used in assessing sound levels as the human ear appreciate them. It is done using an ordinary sound level meter and a little electronic juggling with a circuitry produces something which responds as nearly as does the human ear and to distinguish it from the decibal, it is just tagged with the letter A. This is the simplest explanation I can give for it.

MR. W. J. YURKO

I would like to ask Dr. May if he has managed to classify aircraft noise as to whether it is considered to be industrial noise, municipal noise or what type of noise is it classified as - that is for legal purposes.

DR. C. R. MAY

It depends on the context of the situation. If you are talking about the workers on the landing strip for the airport, then they are exposed to industrial noise. Once a thing is taken off then it becomes a community noise problem.

MR. P. LAWSON

I would not like to try and reduce this problem, but it seemed to me a quick look at that map of the Calgary Airport that most of the runways you show are not in use at the present time. There is only the north-south ones which are in use by jets. The others I think are dis-used, except for light aircraft.

DR. C. R. MAY

The reason for putting the contours on all the runways was to take a count of any extended use of those runways by extending them for other

purposes to take into account emergency use of them, so that you had, as Dr. Rose said, the worst possible conditions which could happen at that airport. You can scrub out whatever ones of those you know are not used as frequently as any others, when you are looking at the situation as it applies to your own residence or any other particular situation, but we put them all down so you could see what was the worst you could possibly be faced with, with the present type of aircraft using those airports.

PROFESSOR PAUL LEWIS

I noticed on the map of Calgary, it occurred to me that the north-south band that was shown appeared to be somewhat longer than the east-west band and I don't know if that can be attributed to the amount of use to the runway. Is there an explanation for that.

DR. C. R. MAY

Yes there is. You apply the noise contour, the noise contours were taken on a standard length runway, so you put it at the base on those things which are circulating, the large red streak in the middle, you put the base on the beginning of the runway and then set down the contour around that. When you do the other direction, you do the opposite, so the longer the runway, the longer your pattern segment, if you have a shorter runway, you have a shorter pattern segment.

MR. J. E. BAUGH

I was startled yesterday when one of the speakers suggested there be no overflying of supersonic jets in Alberta. Perhaps Dr. May could indicate where the PNDB level would be for such an occurrence.

DR. C. R. MAY

This is an entirely different problem. It isn't related to the problem we are talking about. The problem of supersonic jets is the sonic boom and this involves an entirely different type of measurement. If you like, we can talk about that separately later on.

Appendix AMPROGRESS REPORT ON THE STUDY OF THE HEALTH EFFECTS
OF AIR POLLUTION IN ALBERTA

Objective The original objective of this project was to determine whether air pollution in Alberta has yet become a hazard to health by measuring the correlation between respiratory disease morbidity and mortality in different communities and the concentrations of suspended particulate matter and of certain of its constituents in the air of those communities.

Methodology The methodology for this study was described in some detail at last year's meeting of this Committee. Very briefly, the research was to consist of a series of studies covering

- (1) Variations in mortality from lung cancer and other respiratory diseases;
- (2) Morbidity from respiratory disease in selected communities controlled for residential history, occupational history and smoking habits, using the British MRC questionnaire and spirometric measurements;
- (3) Levels of suspended particulate matter in air at selected sites;
- (4) Polycyclic hydrocarbon and asbestiform fibre content of suspended particulate matter;
- (5) Public attitudes and perception of air pollution.

There have been two minor changes in this plan. First, partly because of staff shortages and partly because of the unsuspected complexity of the problem, the Division of Industrial Health Services has been unable to undertake the search for asbestiform fibres, and it has reluctantly been decided to omit this aspect of the investigation. Secondly, by way of compensation, arrangements have been made for every sample of suspended particulate matter to be quantitatively analysed for lead.

Before leaving the subject of methodology, I should like to mention the sampling technique which has been developed for household interviews. An area within a one-mile radius of each high-volume sampler is designated as a sampling area. This area is in turn divided into six smaller areas of roughly equivalent household populations, one for each sampling session. The households in each sub-area are enumerated using Henderson's directory in conjunction with lot maps and a physical survey of the area for the identification of apartments and multiple-family dwellings. The households are numbered, and a sample of 100 households (or 60 households in the case of Camrose and Hinton, which have a population under 10,000) in each sub-area is selected by means of random sampling numbers. Class and level numbers are then randomly assigned to each selected household to establish an order of priority for the sex and age group of the respondent. The sex-age distribution of each sample is designed to reflect that of the community as a whole.

Personnel The laboratory staff, consisting of a research chemist (Ph.D.) and a laboratory technician, has remained unchanged throughout the past year.

The full-time field staff consisted initially of a public health nurse. This incumbent resigned at the end of March and was replaced by a non-nursing graduate (B.Sc.) who had had previous experience as a part-time interviewer.

The use of part-time interviewers for household visits has worked out well. It was learned at an early stage that women are more suitable than men for this work, and the turnover from one sampling session to the next has been within manageable limits. Every part-time interviewer receives approximately one week's training before being turned loose on the community.

Equipment It was part of the basic plan of this study to increase from two to thirteen the number of locations for the monitoring of suspended particulates. Nine high volume samplers were supplied by the Occupational Health Division, Department of National Health and Welfare, with the understanding that they would be located in Edmonton (three), Calgary (three), Lethbridge, Medicine Hat and Red Deer (one each) as part of the national monitoring network. The additional samplers for Grande Prairie, Camrose, St. Albert and Hinton, plus two spares, were purchased with research project funds. However, there was a very long delay in delivery, with the result that the regular collection of samples did not begin in Edmonton and Calgary until February, nor in the other communities until April.

The laboratory equipment was installed in temporary quarters early in January, and the laboratory was ready to proceed with the analysis of suspended particulates for polycyclic hydrocarbons (benzo-a-pyrene and benzo-k-fluoranthene) by the time the high volume samplers began to operate. A move to more permanent quarters is expected at any moment.

Some of the spirometric equipment at the commencement of the study was delivered very late. The most serious delay concerned two of the six peak air flow meters, which did not arrive until June, and it is fortunate that we were able to borrow two of these instruments from other sources. It has been found that the Wright respirometer is an extremely fragile instrument, and in order to keep the study moving while repairs are effected it has been necessary to purchase two additional respirometers to serve as spares for the six in regular use.

Pilot Survey At last year's meeting of this Committee, I mentioned that we had just completed a pilot survey in the Oliver district of Edmonton. One of the main purposes of the pilot survey was to test the validity of our questionnaire. It can be reported that the questionnaire stood up well, and that very few changes were necessary.

Ten of the 94 respondents were unable to complete the spirometric tests, and six of these were aged 65 or over. Since it was also observed that many elderly respondents were reluctant to express any opinions which might be construed as criticism, it was decided to limit the study to persons between 20 and 64 years of age.

Of the 84 respondents who completed spirometric tests, 26 (31.0%) had an FEV_{1.0} less than 60% of the FVC. The figure of 31.0% should be

interpreted with caution, since the FEV_{1.0} and the FVC were measured on different instruments, and it is possible that a correction factor is called for. However, the apparent prevalence of impaired respiratory function is as high enough to justify the conclusion that the target sample for each area in each sampling session could be smaller than 150, which was the target sample for the pilot survey.

Monitoring for Suspended Particulates Samples of suspended particulate matter are being collected during a 24-hour period on a randomly chosen day each week from each of the thirteen high volume samplers. As already mentioned, Edmonton and Calgary have three samplers each, one in a downtown location, one in an industrial district and one in a residential district. In each of the other seven communities the sampler is located downtown.

Laboratory Study The analysis of suspended particulate samples for benzo(a)pyrene and benzo(k)fluoranthene is carried out under the auspices of the Environmental Health Services Laboratory, and is proceeding smoothly. The analysis for lead is done in Ottawa. We now have complete data on all samples collected up to the end of September.

Main Field Study Three sampling sessions have now been completed. Each session occupied an eight-week period, the first between January and March, the second during May and June, and the third between September and November. This concludes our population sampling for 1970. Three similar sampling sessions are planned for 1971.

The three sampling sessions during 1970 have yielded 2,167 interviews, or 58.5% out of the 3,705 attempted. There has been considerable variation in the percentage of successes in different communities. It has been observed, for example, that the sampling areas of Lethbridge, Medicine Hat and Red Deer contain a high proportion of people over 65 who are ineligible by reason of age, and that the downtown sampling areas of Edmonton and Calgary contain not only a high proportion of elderly people, but also a high proportion with a poor understanding of English.

Mortality Study One phase of the study of health effects of air pollution, as already mentioned, is concerned with mortality from lung cancer and other respiratory diseases in Alberta, and this part of the investigation has now been completed.

From an analysis of deaths which occurred during the five-year period 1964-68, it has been found that mortality from lung cancer among both males and females is significantly higher in urban than in rural communities, and that mortality from lung cancer among males shows a very clear urban-rural gradient - that is to say, it is highest for communities of more than 100,000 people, lowest for communities of less than 10,000 people, and somewhere in between for communities of intermediate size. Mortality from chronic bronchitis, although only one-third of that from lung cancer, follows an almost identical pattern. Somewhat surprisingly, mortality from bronchopneumonia is higher in rural than in urban communities.

Plans for Analysis of Results It will be evident from my description of this study that we have set for ourselves a major task of coding questionnaires, reading spirometric tracings, preparing punch cards and programming. Substantial progress is being made, even though there is still a year of data collection ahead of us.

In the meantime preliminary discussions have been held with some researchers at the University of Ottawa, who have been engaged in a similar type of study in the City of Ottawa, with a view to presenting the findings of the two studies in such a way as to facilitate comparison. In the exploratory discussions it has been possible to identify common ground and to reach agreement in principle on certain avenues of approach, with particular reference to the handling of data concerning attitudes. Further meetings are planned in the hope that our objective of compatibility will be achieved.

Dr. E. S. O. Smith
Division of Epidemiology
Alberta Department of Health

Appendix ANDISCUSSION ON PROGRESS REPORT ON THE STUDY OF THE
HEALTH EFFECTS OF AIR POLLUTION IN ALBERTAMR. A. WIGMORE

I noticed the good Doctor was a little surprised that the rate for pneumonia was higher in the rural areas and the question is why? I think probably the reason for this is that a farmer won't go to a doctor until you have to drag him out on his back. Whereas in town, why you can go, he is right handy and I think that pneumonia is developed from other minor bronchial ailments and I have witnessed this quite often, where a man will go out and do his chores, he can't get anybody else to do them, he will drag himself around when he should be in a hospital and I was wondering whether this is perhaps why the incidence is higher in a rural area.

DR. E. S. O. SMITH

I can't tell you why the mortality for bronchial pneumonia was higher in rural than in urban areas. It was a surprise to me, because when I did a similar type of study using Ontario statistics, the situation was reversed. Bronchial pneumonia followed a fairly similar pattern to lung cancer, the only difference was there was an urban rural gradient for females as well as males.

MR. T. A. EDWARDS

Dr. Smith, I am not completely familiar with the term morbidity and I was wondering if you could explain what you meant by morbidity as opposed to mortality. And the second question is has this any relation to incidence, in other words in your studies have you been looking at the rates or variation of incidence of respiratory ailments. The basis of my question was a suspicion of a report that I was made aware of, that although there was increasing, I suppose technology, insofar as medication was concerned, and one might normally expect that the asthmatic could be treated at home as opposed to in the hospital because of better medication, that there might be an increasing incidence in hospital admissions, and my question then is related to whether this type of information was looked at or this type of problem was looked at in your study.

DR. E. S. O. SMITH

First of all, while mortality refers to death rate, morbidity refers to sickness rate. Mr. Edwards has raised some very basic problems that are common to all Epidemiologists. We are trying to find morbidity rates in terms of prevalence, which is different from incidence, by serving the population and finding the proportion of the population of various age groups which have some impairment of respiratory function. We are finding a prevalence rate. This is different from the incidence rate which is the rate at which people in the population fall sick with a particular condition in a given year. Morbidity information on incidence is extremely difficult to come by. There are some sources, but there are problems with all of them. One of them is hospital morbidity statistics. One problem here

is that the hospital population is a select population, only the sickest people go to hospital. Secondly, hospital morbidity statistics count separations, that is discharges or deaths. They take no account of repeated admissions, so they do not count people, they count events. We might some day be able to look at the information being collected by health care insurance commissions, but again this would only be of value for determining incidences, if a distinction is made between a patient's first visit to the physician with a particular condition and subsequent visits.

Appendix AOREPORT ON MANAGEMENT OF PESTICIDES AND POLLUTION CONTROL

When Harvey Hogge called me a couple of weeks ago to see if I would volunteer, military style, to talk about pesticides, I accepted with some reluctance. This topic, of course, is not morbid as Dr. Smith in his last report talked about morbidity, this issue of pesticides is a very alive issue and probably it is one that should be brought up before this meeting because it certainly is one that is very much in the news and people get quite emotional about it. So I was pleased to accept the responsibility to at least try and cover the highlights in pesticides as we see them in Alberta today. Reference to Mr. Martin's remarks about the tremendous amount of interest in pollution control, and the fact that various government people are spending a lot of time attending meetings, panel discussions, there are a number of us in Agriculture who have been doing this for years and I think we find that we are at least at one meeting each week on something to do with pollution control. This is very good, we are pleased to see the tremendous amount of public interest, but it does cut in a lot into the time when we should be doing our regular work. It puts quite a strain on facilities and I would like to acknowledge my appreciation of those people who I work with and the people we meet on panels, to try and pass on information to the public, at least information as we know it.

I am pleased to talk about management of pesticides and pollution control, because I think management is probably the right term for it. The management of pesticides for their proper and safe use has a long history in Alberta. Pollution control and environmental conservation were practised long before the terms were coined or recognized. The public concern of recent times should be encouraged because public alarm can result in chaotic action. We have problems in pesticides, but there is no major crisis. In the ten minutes available for presentation, I will attempt to provide some of the highlights. Further details are available in various reports, including the summary statement on pesticides and mercury in Alberta prepared by government staff for the Alberta Legislature in February, 1970. Now this is a fairly large report, although there are some bigger ones. This one actually is summarized down to ten pages of information on pesticides and mercury and it has 24 pages of documentation, including a listing in brief chronological order of activities in the management of pesticides for the safe and effective use from 1948 to the present time. This document was tabled in the legislature, it has been widely distributed and it is available from our department.

I might give as an example as to what has been done in the past in the control of our most devastating crop pest, the grasshopper, highly toxic arsenic and flurosilicate poisons were used since the early days of settlement. These were replaced in 1949 with bates containing chlordane insecticide. Over the next few years, as new materials were proven by field tests, chlordane, aldrin and dieldrin insecticides came into use as crop sprays. Rates were decreased from 12 to 2 to 1 ounce actual insecticide per acre for effective control and the cost came down from about \$1.00 an acre to 15¢ an acre. In the early 1960's the problem of persistent residues was discovered. Investigation and testing continued to develop and replace the persistent organo-chlorine insecticides with shorter lasting

organophosphates. Malathion and dimethoate came into use for grasshopper control in 1962, 1963 and are still in use today. These are some things that happened some years back and it is not just due to the recent panic. The Food & Drug Directorate monitors for pesticides, as well as for other contaminants in food across Canada. We, in Alberta, considered that 50 to 100 food samples monitored per year was not sufficient, so since 1961 the province monitors about 2,000 samples annually to check for pesticides in food, feed, soil, water, fish and wildlife and the general environment. This is a joint program with Federal Food & Drug for food products and with Federal Agriculture which monitors commercial animal feeds. The Provincial Department of Health analyzes all water samples for pesticides to get the best use of laboratory facilities.

Although monitoring is only part of the pesticide management scheme, it helps to locate and define problems, provides a view of the provincial situation and trends and changes over the years. Problem cases are defined, followed up to determine source and amount of contamination and action is taken to keep produce out of consumption by humans or animals until safe levels are reached, and the source of contamination is eliminated. It is reassuring that of the 5,800 analyses of water over the last four years only 80 were positive for a pesticide. This includes, and when I am talking about pesticides here I am covering the whole gamut, insecticides, herbicides, fungicides, rodenticides, molesticides and others. These 80 positive cases were generally in trace amounts. The one positive analysis in this year 1970 showed 1-1/2 parts per billion of 2-4D herbicide. Another universal commodity - milk - is under continuous random sampling. We have experienced problems on dairy farms and in milk plants in the past, but none in 1970. One poultry farm of 6,000 laying hens was picked up this year. I am using this as an example of how we operate. Special spring survey of eggs throughout the province gave negative results, including this farm, however a fall resurvey showed dieldrin residues and 1,400 older hens, following confirmation of the results, these 1,400 hens were destroyed by the voluntary co-operation of the farmer. Production in sale continued from 4,600 pullets that were not contaminated. There was no indication of aldrin which converts into dieldrin or dieldrin itself in use or contamination on the farm and it probably resulted from feed purchased off the farm.

During 1970 the mercury problem in game birds was resolved and the 1969 ban on hunting for pheasants and Hungarian partridge was lifted. Investigation on mercury was continued under the co-ordination of the Alberta Inter-departmental Committee on pesticides, or what we commonly call the A.I.C.P. Some 442 game birds were analyzed in pool samples of 3 to 11 birds of the same species. Mercury levels were quite low in the spring, around .02 parts per million mercury. These levels increased during the seeding season and for several weeks following planting. This is spring planting of farm crops. However, July average levels were lower than those of previous years. In 1970, this year, the average levels were .25 parts per million as against 1968 results of .45 and 1969 results of .6 parts per million mercury and these levels were well below the .5 parts per million mercury tolerance allowed by food and drug. So the way it all ended up, the levels of mercury we found are voided fairly rapidly from the body of a bird, whether it is a domestic chicken or a pheasant, half life is somewhere around two weeks which helped out in our case. It is a somewhat different situation the way mercury is kept in the body of man and in the bodies of fish in the water environment. We ended up with about the same levels in the fall as we started

with in the early spring, the levels at the present time are showing September levels in collected birds at around .02 parts per million. So probably a very short summary would be that we did not have to ban the hunting of game birds in the fall of 1969, if we had had the data back from the laboratories in sufficient time. We did not get this data back until December and January of this year. One might question the amount of work, the amount of expense that we went to, but I think that a lot of very useful information has come about and I believe our work here triggered off some of the investigation of mercury across Canada and the United States.

There is definite evidence of more careful use and handling of mercury in wireworm insecticide treated seed. Mercury seed treatment at our 1968 municipal co-operative seed cleaning plants decreased about 42%, insecticide treatment decreased about 60%. Treated seed in transit was tarped to prevent spillage and there were no cases of dumping of unwanted treated seed reported, except at nuisance grounds, despite thorough checks by provincial and municipal inspectors. The Federal Government has announced that mercurial seed treatments will not be re-registered for sale in 1971. That's just a month from now. We support the plan to phase out mercury seed treatment, but not an immediate ban. Time is required to phase in effective replacement and to use up mercury stocks on hand to avoid a large disposal problem. There is no known connection between mercury seed treatment and the mercury problem in fish and the water environment. Yet despite all this, there is a very good possibility at the end of this year that mercury seed treatments will be banned and some of us are quite concerned about what's going to happen to the 45 gallon drums of mercury that we have throughout the province. It is felt that the best way to dispose of this is to put it on as a seed treatment and disperse it over the 12 or 13 million acres that we seed, because actually the amount of mercury applied is something in the neighbourhood of one and a half ounces of mercury per quarter section of land, 160 acres, and this is a very small part of the natural mercury already in the soil. But what happens, I think, we'll just have to wait and see.

The Agricultural Chemicals Act, passed in 1969, came into force on April 1st of this year, along with two regulations that deal with the use and handling of agricultural chemicals and one that covers the use and application of pesticides. Very briefly the new legislation places the onus of responsibility for proper use on the person or agency involved, including municipalities and governments, for use, handling, storage, transport, application and disposal. To date there are some 250 trained and licensed pesticide applicators and about 110 provincial and municipal inspectors appointed under the control program. I think probably on the strength of the program is the fact the act is being administered by municipalities, both urban and rural, so this brings control right down to the man on land and the man on the street. A three-man committee from Agriculture, Health and Fish and Wildlife developed the act and regulations, starting back in 1967. A five-man Agriculture Chemicals Advisory Committee with the same representation plus industry has been established to advise the government on regulation and control programs, training, licensing, liability insurance of pesticide applicators and so on. The legislation by itself solves few problems. Proper administration and education are necessary. We have good co-operation and co-ordination at the district and municipal levels, especially through local agricultural service boards. The county agricultural fieldman works closely with the district agriculturist, he is a

trained and licensed pesticide applicator as well as an inspector under the Agriculture Chemicals Act. He sets an example in proper municipal programs of pesticide use and application and expects others to follow. We think that this has a lot of merit, that government and municipal agencies have to set the example, a proper example, before we can expect the general public to follow. Effective and safe use of pesticides depends on the actions of many individuals and agencies. Regulations and control programs must be practical and reasonable, understood and supported by the majority. Pesticide recommendations are up-dated annually by a number of committees. This information is available in printed publications and from training courses available at colleges at Vermilion, Olds and Calgary and a correspondence course from the University of Alberta.

In Alberta co-ordination and liaison of interest and purpose is accomplished through several committees such as the A.I.C.P.. This Alberta Interdepartmental Committee on Pesticides, as well as most other committees, is composed of representatives from Federal, Provincial and university interests in agriculture, health, fish and wildlife, industry and ecology. Provincial committees are tied into regional, national and international groups which have access to, and feedback from, the United Nations Agencies such as F.A.O. and W.H.O. Now we have quite a number of committees that are active in the management of pesticides. I have a list here, but I notice the time is running on. I'll just go through them very briefly. We have an agricultural or Alberta Crop Production Board that started up in 1957 and in 1965 reverted to the Alberta Agricultural Co-ordinating Committee. We have pest control and weed advisory committees who were established back in 1957, western committee on livestock pesticides started operations in 1959, a wildlife predatory conservation committee established in 1959, but recently was phased out and not restructured. A national committee on pesticides which started operations in 1961, a western committee on crop pesticides 1962, national weed control conference with western and eastern sections, a food residue committee within our own department that looks after residue problems and other things that come up from time to time. The A.I.C.P. which I have talked about started operations in 1965, another committee added in 1968, the aquatic plant control committee that deals with problems especially in recreation areas with weeds and other unwanted plants in water and the last one is our own committee formed under the new act, the Agricultural Chemicals Advisory Committee, established this year.

Over the years many problems have been resolved by joint action through these committees without publicity or fanfare. However, we have failed to keep the public informed of the various continuing activities designed to maintain quality food and environment. Certain pressure groups insist that we have a serious D.D.T. problem where, in fact, major uses of D.D.T. were phased out several years ago, along with other persistent pesticides, and in spite of periodic statements by self-appointed ecologists and others we have no significant problems from pesticides in wildlife that we know of. I say significant because conditions change from time to time and probably this afternoon we could discover one.

Some other important developments during 1970 were, and I will summarize here, Mr. Chairman, because time is running out.

1. An inventory was made in co-operation with the Provincial Fire Commissioner's office of all commercial and public warehouses of agricultural chemicals and a plan for fire protection is being developed with local Fire Chiefs and municipal officials including the use of warning placards for posting chemical storages.
2. Licensed pesticide applicators have been divided into seven special classes instead of the previous two that we had under the former Department of Health program, the Department of Health ran this program for about three years until the new legislation came along, that is to do with licensing of pesticide applicators. Applicators must meet qualifications of training and experience in the proper class, must carry public liability insurance or bond and must get at least one medical examination annually.
3. The use of more toxic compounds such as parathion is allowed by permit only where special conditions warrant such.
4. The use of all pesticides in or close to water is allowed by permit only, where warranted by the Provincial Board of Health and there has been reference made to this.
5. D.D.T. has been banned from use in large area programs, such as community mosquito control and forest insect campaigns. Registered use of D.D.T. was reduced about 90% from 62 to 12 crops with no further small packs available for home and garden use.
6. The Federal Government restricted 245T herbicide use in urban recreational and other inhabited areas or in water during the year. The Provincial Board of Health further restricted 245T use adjacent to public waters.
7. The A.I.C.P. I mentioned before assisted Federal agriculture in reviewing label use claims for ten persistent insecticides. Considerably restricted 1971 use will be available for things like aldrin, benzene, hexachloride, chlordane, dieldrin, endrin, heptachlor, lindane, methoxychlor, parathion and toxaphene.
8. Considerable action was taken by municipal, provincial and Federal governments, along with industry, to develop systems of decontamination and disposal of unwanted pesticides, and other hazardous compounds. However, much research, development and implementation is still necessary and we are faced with this problem of left over things, what do we do with them, so our system of management has to include this, we have to look far enough ahead that we do not create problems, as we resolve some. I hope I have left the impression that definite progress has been made and that we have the system and organization for further improvement. However, problems remain. We need more selective pesticides, better application methods and techniques, more non-chemical control of weeds and pests, better disposal methods of unwanted pesticides and better education and understanding of

the producer and consumer. Our wisdom in the proper management of pesticides will have to keep pace with developments, now and in the future.

J. B. Gurba, Head
Crop Protection & Pest Control
Alberta Department of Agriculture

Appendix APDISCUSSION ON REPORT ON MANAGEMENT OF PESTICIDESAND POLLUTION CONTROLMR. H. LEMBICZ

As a layman, I would say that the word Mr. Gurba used, panic, is hardly right. I think that it is just a case of the public recognizing that there are some species of birds around are on the way out, and recognizing the fact that hard pesticides with hydrocarbon base are going to be with us for a considerable time, as I understand they have a half life of at least 15 years, and the other fact that I think the layman recognized was from the findings of the biologist that these types of pesticides are spread clearout through all our oceans and all over our world, and they were only recognizing some things that come to light and the other thing I think of significance here, and will make people wonder, is because with our experts in this field, there was a considerable number of years that these pesticides had been used and the fact was not recognized of the damaging effect it could have upon our wildlife. Another question I wanted to ask was, possibly Joe could not answer this because I believe it is a Federal matter, but maybe you can answer it anyway, the Federal Government extended the ban for another year, the ban was supposed to take place in 1971, is extended now to 1972. Why was this done?

MR. J.B. GURBA Which ban are you talking about?

MR. H. LEMBICZ DDT.

MR. J. B. GURBA

There were certain things that were restricted for 1970, for instance the use of large area programs for mosquito control in urban areas. The use of DDT for large area mosquito control in the city of Edmonton, this was out in 1970 and the same for the use of DDT in the far northern areas or for forest insect campaigns, but DDT was still allowed for use by the individual for certain specific things. That reduction from 62 to 12 crops took place this year and what did happen is that the small packs on the market for use by the backlot gardener, person like myself living in the city, I can still use DDT this year according to the old label, but this will not be allowed for 1971-1970 was allowed as a cleanup year for these small packs on the market, but some of the major uses of DDT were forbidden for this year.

MR. H. LEMBICZ

I understand we'll be able to use DDT for - until 1972 now.

MR. J. B. GURBA

Only a few small items in crop production on flea beetles, rape and mustard, and for the control of horn flies on range cattle, cattle out on the range.

MR. H. LEMBICZ

In other words, it's restricted?

MR. J. B. GURBA

It's cut right down to very few uses.

MR. H. KRUSCHE

When will we be able to get rid of the presently stored amounts, larger quantities, in the cities which we want to get rid of, and I understand there's some political things connected with it. We are storing in the City of Edmonton, besides the 20 gallons we have collected from the public, quite a few drums of DDT.

MR. J. B. GURBA

Well this problem of disposal of unwanted and left over materials, I am not going into the political part of it here, but this is the problem that faces all of us and both the Federal Government and various provincial governments are working at this thing, there are no sophisticated methods of getting rid of these left over compounds. At the moment, it is either burial or incineration. We have Doctor Perry here from the Suffield Defence Research Station. I wonder if he'd care to comment on this, because I think the Department of Defence is doing more work in this area than any other organization I know of.

DR. B. J. PERRY

Well we have imposed the problem at Suffield as it relates to the very heavy stocks of DDT and oil solution held by the Canadian Armed Forces - this runs into many, many thousands of gallons. At the present time we have investigated the available incineration systems for the disposal of these materials. I am in the process of obtaining such equipment. Hopefully we can purchase this by the end of March 31st and hopefully again it will be operable by mid-1971. Our first problem will be to dispose of the Canadian Forces stocks, thereafter any stocks from any other organizations we'll be prepared to accept and try to dispose of. Obviously shipping to the station will have to be paid for by the people sending it. We have investigated other means, mainly by deep burial in clay, but to date with no water sources around on the area we have down there we have several suitable locations. However, to date this has not been acceptable. What I am referring to here, of course, is a permanent burial ground, marked and everything else for the future. We are looking at the problem, we are doing something about it and within a year we'll be able to look after your stocks. In the meanwhile, as soon as we have this complex set up, with some form of storage, or if people do have material that is capable of being stored outside, we would be, I suppose, later on, maybe early in 1971, prepared to accept this to store it until such time as we can handle it.

MR. J. B. GURBA

We appreciate this offer of the Federal Government to try to do something about this problem of disposal. I think beyond that it is now a matter of the Federal Government, the Provincial Governments getting together and setting up a proper scheme.

Appendix AQREPORT ON ZAMA LAKE OIL DEVELOPMENT
IN A SENSITIVE ECOLOGICAL ENVIRONMENT

I guess first I should thank you for putting up with me twice in such a short time and I promise to be brief. The Zama Hay Lakes area is located in the extreme north-western corner of Alberta and it is North America's largest breeding and staging area for ducks and geese. Obviously, this is a most difficult place to contemplate mineral resource development. Shortly after the first oil discovery in the Rainbow area in 1965, and these dates really aren't important, it became apparent that the formations that were productive in Rainbow might also be productive in the general area in which the lakes were located and in the specific area of Zama and Hay Lakes particularly.

A very shallow water area and a variable flooded area, which are physical features of lakes, that attract the high population of migratory birds, also help make it feasible to consider exploring and developing the lake area. The flooded area varies dramatically with the climatic season. This in turn contributes an abundance of food and makes the area attractive for both nesting and staging of these birds. On the other hand the shallow water freezes to bottom in the winter, providing easy access to the lake for petroleum exploration and development activities. However, the periodic presence of the migratory birds made it apparent that special emphasis had to be placed on the prevention and control of any contamination. Shallow water and variable flood required that the plan and facilities for such a prevention and control plan be amphibious in nature. Later today Mr. Bohme of the Oil & Gas Conservation Board will be describing the specific regulatory requirements that were developed jointly by the Oil & Gas Conservation Board, by other Government departments and agencies and by industry to insure protection of the environment, so I won't get into those in this little talk.

As a representative of industry, I would like to emphasize four points in this brief review. First a major preplanning effort was required on the part of both government and industry well in advance of each phase of exploration and development to achieve the objective of timely implementation of realistic and effective rules to protect the natural environment. Secondly, the kind of co-operative effort which we in industry have come to expect in Alberta by all the government agencies involved with the problem, and, of course, by industry as well, led to the achievement of this objective. It wasn't easy for any of these groups involved, but the results I have to say were very effective. Three - while my company was not necessarily in agreement with some of the regulatory requirements, we fully accepted them because we had the opportunity to contribute our points of view and because the requirements were made known to us sufficiently early to be included in our business planning. And the fourth point is that we, as a segment of a resource based industry, fully accept as the cost of reasonable conduct of our business the expense that has been added to exploring and developing oil reserves in the Zama Hay Lakes area, by special measures that we have had to take to protect the environment. We acquired the right to explore

the lands underlying Zama Lake in 1966, four years ago. We immediately began to define the environmental problems associated with conducting an exploration and development drilling program in the event that our seismic should prove to be encouraging and it turned out that they were.

These plans were reviewed by all interested government departments and agencies, who themselves had undertaken a similar effort. This planning phase culminated in the fall of 1967, about a year later, when special requirements were finalized by the Conservation Board and made a condition in the granting of each exploratory drilling license. We drilled two exploratory wells in the winter of 1968 and this is another year later, they were both dry holes. In the meantime planning, joint planning with the government agencies was focussed on problems associated with development drilling and oil producing operations. During this phase communications between industry and government agencies was greatly simplified because the Oil & Gas Conservation Board assumed the co-ordinating role for all the interested government bodies and this was most important because so many government bodies were involved. Still another year later, this was in 1968-69, we did an additional exploratory drilling program, this resulted in three discoveries, wells capable of oil production on a commercial scale. We then went into a second planning phase which culminated in the Conservation Board issuing special requirements applicable to development drilling, production and general operations in the area. This was finished almost six months in advance of the earliest possible development drilling in the lake in the following winter. Now we did the development drilling program on the lake last winter and before spring breakup we constructed permanent production facilities. I believe Mr. Bohme has some slides to show you - what these things look like. And currently with this development program, we finalized our pollution control plan for a producing operation rather than an exploration operation and acquired the equipment necessary to carry out this plan, we received approval by the Board prior to any of the wells being placed on production in March of this year. Now this little story of a resource development project, successfully accomplished under unusually tough environmental conditions is, in my opinion, a classic example in the sense that it is not unusual in this province of co-operative effort and understanding between government and industry. Now I am sure it will be no news to anyone in this audience that planning by government and industry to prevent potential problems is an every-day part of our business, whether the problems are ecological or otherwise, although I guess there might be some, including myself, who might argue that we could be better at it than we are. Now having said that, I presume you have to ask the question - how do we go about it in a better fashion.

I wish I could tell you that the answer is a simple one. We, as a company, and I guess I can speak for industry as a whole, agree that regulations are necessary and accept that in any case they are with us in ever increasing numbers, we are convinced that any significant improvement in our effectiveness in preserving the environment, or as far as that goes, improving it in anything, is highly dependent on three basic factors and these are simply the attitudes, the interests and the training of all of our staff, whether they be managerial, technical or operating, and in order to try to bring this about we spend a considerable amount of time and effort and money in my company, or in any company that expects to be in this business very long, to ensure that our people at all levels in the organization are aware of the influence that their particular actions can have on the environment and I want to finish up by saying that we in another co-operative effort with the government pray for a little assistance on how to keep the inevitable accidents from being big ones.

W. L. Grossman, Vice-President
Shell Canada Limited

Appendix ARREPORT ON POLLUTION CONTROLALBERTA MEDICAL ASSOCIATION COMMITTEE ON PUBLIC HEALTH

1. The Alberta Medical Association Committee on Public Health met three times to discuss its present task, which originated at the Annual Meeting in September 1969 with the resolution:
2. "That whereas mankind is proceeding apace in the direction of his own destruction by the pollution of the environment, especially by the use of pesticides and by bacteriological warfare, be it resolved that the Committee on Public Health devote close attention to these matters and report the results of its studies in the Alberta Medical Bulletin, to the Canadian Medical Association, and to the next Annual Meeting of the Alberta Medical Association".
3. As a result of this motion, the Committee was asked by the Board of Directors to submit a report within six months, for the consideration of the Board.
4. At its first meeting, the Committee discussed the terms of reference and decided that bacteriological warfare was not within its scope for the following reasons. First, it was considered that as warfare of any kind was a deliberate attempt at the destruction of man and his environment, it could hardly be considered in the same reference as pollution, which is normally regarded as being the accidental outcome of processes which are basically designed to better mankind. Secondly, the Committee decided that, bacteriological warfare could not be discussed alone, out of context with chemical and other types of warfare. It did feel, however, that some consideration might be given to the toxic materials involved if, in the course of manufacture or transportation, they should cause pollution. The Committee recommends that the Department of Health consider specific regulations to cover the manufacture and transportation of these substances.
5. Because of the enormous scope of the subject, the Committee decided to confine observations to pollution in Alberta, apart from some general remarks on world-wide pollution as it affects or compares with pollution in this Province.
6. It is not possible to think of eliminating pollution altogether. Pollution control must be tied in with the economics of industries and of countries. Where pollution control may be so vigorously applied as to close industry, then unemployment and serious loss of revenue may result, which could, in effect, be worse than the original pollution. In nearly all cases, pollution control will be the result of compromise. However, in making these compromises, the future of land, water and other environmental components for human use, and for wildlife ecology, must be very carefully studied.
7. The Committee is of the opinion that once an industry is given license to operate, then in most cases, some degree of pollution must be tolerated if the business is to be commercially successful. Therefore, we

are of the opinion that before a license is granted to any industry, a very careful comparison should be made of its ultimate value to the people of the Province, against any deleterious effects it may have on land, water and air resources, which will be in such increasing demand by a rapidly growing population.

8. The Committee thinks that basic standards for pollution control of all types should be Federal standards, applicable throughout the country, with, if necessary, well defined regional differentials. Implementation of control could be provincial or regional as may best suit the problem, but Federal authorities should have supervisory powers in determining the action to be taken, and in setting reasonable time limits in which conditions should be brought up to standard. These Federal standards should be at least as stringent as any existing provincial standards.

9. The Committee feels that, while a vast amount has been written and spoken on the matter of pollution control, action has often been neither quick enough nor forceful enough to achieve desired results. We wish to congratulate the Minister of Health, Government of Alberta, on the introduction of the "Environment Conservation Act", which should do much to co-ordinate pollution control within the Province. However, we express concern that the Environment Conservation Authority appears to have no powers of enforcement. The Committee strongly urges that the Authority should have full powers, punitive if necessary, to see that its recommendations are fulfilled.

10. In Alberta we are fortunate that pollution is as yet only beginning, as compared with that in other provinces and other countries. We probably still have one of the cleanest skies above our heads, and our cities, when compared with other large cities on the continent, are only just beginning to notice photochemical smog. Yet we have just as great potential for pollution as any other area. In our country areas, we have oil wells that emit black smoke; gas wells that are capable of filling the air with sulphur dioxide and hydrogen sulphide; sulphur extraction plants that not only spew out sulphur dioxide and hydrogen sulphide, but can also cover the ground with sulphur dust either directly or along transportation routes between the plants and the market. We have pulp mills, mineral mines, strip mining and other industries, which can and do add their contribution to the pollution of air, soil and water. Our cities have rapidly increasing numbers of industrial concerns, and, with greatly increasing populations, the internal combustion engine is accelerating the pollution of the atmosphere.

11. During its deliberations, the Committee discussed pollution problems with experts in various fields. These fields were:

- I. Water pollution.
- II. Air pollution with special reference to pollution by internal combustion engines.
- III. Pollution of foods.
- IV. Pollution caused by pest control.
- V. Pollution of soils and crops.
- VI. Pollution by noise.
- VII. Pollution by radiation.

All of these will be considered separately.

I. Water pollution

12. The Committee is concerned at the deterioration in the quality of the water in our streams and rivers, between the time they leave the foothills, and the time they cross our borders. Among the more important of the water pollutants today are the various nutrients that are being flushed and leached into water supplies, to such a great extent. Among the most common are nitrates and phosphates, which are major constituents of detergents and fertilizers.

13. Others are industrial wastes, some of which we understand have made a section of the Oldman River one of the most polluted streams on the North American continent. Oil and pulp and paper industries are also responsible for a considerable amount of water pollution. Among industrial pollutants must be considered thermal pollution, which can be so damaging to aquatic life.

14. Pesticides from agriculture and forestry, especially the long acting, "hard" insecticides, form a major pollution problem through leaching and surface drainage.

15. Smaller, but of growing importance, are the possibilities of pollution from strip mining, and from snow dumping during winter street cleaning operations.

16. One of the greatest causes of water pollution is the under-treated effluent from municipal and private sewage disposal systems. From large municipalities, these effluents have for many years virtually stopped natural life in many lakes and rivers in Europe and the U.S.A., as well as in this country. The effects of this type of pollution are still being noticed whenever developments take place on, or near, clear bodies of water. Examples of this are evident in this Province.

17. Even individuals can add to this problem, by such actions as washing cars in or near streams.

18. The Committee feels that industries must be judged individually in this respect, but strict standards of operation must be demanded. We can see no reason why an industry or municipality in one place should be permitted to spoil the potability, beauty, recreational value, or further use of the water, or products of the water, by other industries in another area.

19. The Committee understands that in Alberta standards for water purity have been established, and that with some increase in equipment and staff the responsible agency can quite easily monitor water purity in any river, stream, or lake, in the Province, that may be endangered. The Committee is, however, concerned at the apparent fact that the Department of Health Regulations, regarding water purity, do not have enforcement clauses. We feel that the relevant inspectors of this Department should have full powers to enforce the Department's regulations, and that they should be encouraged to do so.

20. It is hoped that Federal standards, in at least the same degree, will soon be forthcoming.

II. Air pollution

21. In Alberta at present, except for localized problems, air pollution is not a great menace. It could undoubtedly become so, if precautions were not maintained. Many safeguards have already been instituted, and there is evidence that they will be continued. The areas most affected are the cities, and a few areas in the country in which are located industrial concerns, such as sulphur extraction plants and their related gas wells.
22. In the large cities pollution appears to be mainly related to two sources.
- (a) Industry
 - (b) Traffic driven by internal combustion engines.
23. In smaller cities and towns, without major industry, air pollution is still largely caused by actions of individuals.
24. Industry, especially new industrial concerns, are already subject to fairly stringent air pollution controls in the planning stages, particularly with regard to stack emissions. Older established industries, as might be expected, are more difficult to control, but here also it is apparent that considerable progress is being made.
25. As opposed to this, internal combustion engines, including those of jet aircraft, appear to be increasing the load of pollutants emitted into the air. Not only is the increasing amount of traffic adding to the burden, but the present and probable future trend of erecting contiguous high-rise buildings concentrates the effects of this pollution. The Committee has heard evidence that the newer anti-pollution devices, that are to be fitted to automobiles, will do little more than maintain present levels of pollution, in the face of increasing numbers of automobiles in the streets. The Committee is very much concerned at the possible effects of the Alberta winter climate on some of these newer anti-pollution devices, especially catalytic mufflers, which it feels may not work at all during the average running time of a commuter driven car. In view of this, the Committee feels that a careful study should be made of the automobile industry, with special investigation of these newer anti-pollution devices, which will certainly be expensive, and may not be of any value to pollution control, for the average driver, during a large part of the year, in this Province.
26. In the cities which are the places where pollution is of major concern at present, and is likely to be in the near future, consideration should be given to alternative methods of transportation such as rapid transit systems, or to the possibility of using other types of fuel, such as propane, which will avoid nearly all pollution, except for that caused by nitrogen oxides. The use of these fuels is feasible, and they are, in fact, being used in many cities for city owned vehicles. It is felt that the various external combustion engines, including the steam engine, are not yet far enough advanced to be worth practical consideration at the present time.
27. The Committee is strongly of the opinion that the threat of air pollution within cities, produced by the internal combustion engine, is of such urgency, that it should be kept under constant review by an expert committee, which should report directly to the Environment Conservation Authority.

28. The Committee has had explained to it the various methods for monitoring air pollution, and thinks that while the present numbers and sites of monitoring appliances seem to be doing an adequate job, it is essential that review be taken periodically, to ensure that new conditions are being adequately met, and also to ensure that if better locations for monitoring equipment become available, that use is made of them.

29. The Committee feels that urban planning is of vital importance to pollution control, and is much concerned by the fact that in one instance at least, a properly located industrial area is rapidly being encroached upon by apparently ill conceived residential developments. This matter, it is understood, has already been brought to the attention of the Minister of Health through his Pollution Control Advisory Committee; but it should be emphasized that, in this respect, proper planning authorities, in consultation with health authorities, should have complete control, subject only to appeal to the Environment Conservation Authority.

30. In rural areas, pollution by the internal combustion engine, is not yet a source of immediate concern to health. Industry is, however, a growing source of concern for the future. While air pollution from industry may not yet be a threat to the health of man, animals or crops, except in localized areas, the increase in the number of industrial plants is bringing these areas closer and closer together.

31. The Committee expressed concern that much of the air pollution in rural areas, like that of thick smoke from flaring oil wells, is still legal, within limits. Other pollution, such as the emissions of hydrogen sulphide and sulphur dioxide from gas wells and sulphur recovery plants, is also legal, within certain well defined restrictions. While limits to the permissible amounts of these gases exist, the Committee does not think that present monitoring devices are sufficient in number or quality to detect sudden and short time excesses of pollution above these accepted levels. The exposure cylinders that are now used around gas processing plants are valuable, in giving an overall picture of pollution over a long period of time, usually one month. These can be supported by periodic checks of stack emissions, conducted by members of the Air Pollution Branch of the Department of Health. Immediate investigation of a complaint of excessive emissions of pollutants can only be made with accuracy by one of the Department's mobile trailers, and these are neither mobile enough, nor in sufficient numbers, to be of much use, unless complaints are so frequent as to form a pattern which demands investigation.

32. The Committee strongly recommends that complaints should be more quickly investigated; this goal could be achieved by increasing the number of inspectors near major sources of pollution. These inspectors should be located within five to fifteen miles of probable sources of complaint, rather than the more than fifty miles away, which seems to be the common practice now.

33. Inspectors, who need not confine their work to air pollution alone, could use portable types of equipment, which though not as accurate as the more sophisticated apparatus of the trailers, will still give acceptably accurate results, if they are used at the right time, in the right place, and could thus lead to quicker and more positive remedial action.

34. The Committee is deeply concerned about one legal aspect of pollution. In rural areas, much major pollution is now caused by recently established industry. The Committee feels that where pollution, which can reasonably be attributed to that industry occurs, and similar pollution has not previously been evident, then the industry should be responsible for showing that it was not the cause of the pollution, rather than putting the onus on an aggrieved person or municipality to show that the industry was, in fact, responsible. The latter can be very difficult and costly, and may well be beyond the means of individuals or local governments, even when the presumptive evidence is in their support.

III. Pollution or contamination of foods

35. In respect to the pollution of food and drink, the Committee believes that many of the additives used in the industry today have good qualities, which outweigh their disadvantages, and it feels that in this subject it can only encourage the Food and Drug Directorate, Department of National Health and Welfare, to continue to keep an alert eye on the newer additives and substitutes, as they come into use. The Committee does, however, advocate continued monitoring of toxic or deleterious substances such as pesticides, fungicides, and antibiotics, both at the Federal and provincial levels.

IV. Pollution caused by pest control

36. As pollution by the 'hard pesticides' was one of the specific subjects mentioned in the original resolution, it is well that something be said specifically about these. The effects of the 'hard pesticides' have come into many of the various aspects of pollution that have already been considered, including water pollution, soil and crop pollution, and the pollution of foodstuffs. The term 'hard pesticides' is usually reserved for the chlorinated hydrocarbons such as DDT, lindane, aldrin and others, which are extremely stable, and which consequently, remain potent for long periods of time. Of these, the most important undoubtedly is DDT, which has recently fallen into such disrepute, because of its fearsomely widespread misuse around the globe, and because it is the cause of accumulated toxicity in predatory birds and beasts along various food chains. Most of the long acting insecticides have already been banned by many authorities, and the use of DDT increasingly discouraged. The Committee feels that in affluent societies where more expensive, shorter lasting insecticides, can be substituted, this action is proper. However, it would like to comment on the fact that DDT, since its introduction in 1944, has probably done more good to more people than any other single substance, and that it still has no equal for cheapness and effectiveness, especially in the control of arthropod pests and carriers of disease. Therefore, it will almost certainly continue to be used in underdeveloped countries, and may well have to be called back from limbo to deal with certain specific arthropod problems, even in the industrialized countries. The Committee feels some concern about the fact that the organic phosphorous and carbamate insecticides, which are coming into use as substitutes for DDT and the chlorinated hydrocarbons are, in general, far more toxic, and have in the past been the cause of accidents.

V. Pollution of soils and crops

37. The Committee has been given a briefing on the present status of pollution in this area. It seems clear that pollution by fertilizers,

insecticides, and herbicides, is usually the result of misuse of the materials concerned, either in the time of application, or in the amounts applied. The same seems to be true of pollution by mercurials, for which substitutes are now being sought. There is much new legislation in this field of pollution control which, if it is properly applied, should result in maintenance of minimum levels of pollution.

VI. Pollution by noise

38. It is only very recently that 'noise' has come to be recognized as an environmental pollutant. All high animals, man included, use noise both as a means of effective communication, and to orientate themselves to the world around them, and to this end have a highly developed sense of hearing. To most people, however, there is a point at which total noise level rises above what is needed solely to enjoy life, when noise becomes "unwanted sound without agreeable quality", and it is when sound levels exceed these limits that noise becomes a pollutant.

39. The Committee knows only one proven effect on the human system of excessive noise - hearing loss. Noise has been blamed for many other unwanted effects on health such as mental illness, but at the present time far too little research has been done to substantiate such allegations. Many people, however, will testify that excessive noise interferes with speech communication, disturbs sleep, produces a subjective reaction to annoyance, increases fatigue, disturbs concentration, and can be distracting to the extent that it plays a part in accident causation. It is apparent however that susceptibility to, and tolerance of, noise is highly subjective, and varies considerably from one individual to another, so that what is excessive for one person can be quite tolerable for another; it is also apparent that a person's level of tolerance is not a constant factor, but can vary considerably from time to time.

(a) Industrial noise.

40. Excessive noise is produced almost entirely by man at work. The sources of noise are known, and the sound levels can be easily measured, as can also the effects on hearing. The Province already has regulations designed to protect the worker from the effects of excessive noise. Although some firms have used these regulations well, it seems that throughout much of the industry the management of noise problems is less than desirable; the Committee has heard evidence that there are only eighty full-time occupational health nurses employed throughout the whole of the Province. Some manufacturers have done much research on noise levels in their own equipment, and although it is technically possible to reduce considerably noise levels at source, the means employed almost invariably reduce the efficiency of the product.

41. The Committee feels that industry should play a much more dynamic part in noise reduction, and that agencies responsible for anti-noise enforcement should be given greater powers, or should use their existing powers more effectively.

(b) Community noise.

42. Probably much of the effect of background noise on the community is emotional, but because so little work has been done on this, the Committee is unable to say whether the community's health is being adversely affected. It is reasonable to assume, however, that the effects are not all good, and the Committee is of the opinion that much more research needs to be done on this problem, and that legislation should be introduced to curtail major sources of this pollution.

VII. Pollution by radiation

43. We feel that the Government of Alberta legislation now affords protection against those aspects of radiation (x-ray and lasers) not already covered by Federal and Atomic Energy Control Board regulations.

44. The careless use and manufacture of the increasingly common micro-wave cooking ovens is probably the only universal public radiation hazard of the immediate future. These have to be inspected before use, but it is difficult to foresee adequate inspection after they have been installed in a home. This Committee urges that realistic warnings be given to purchasers and users of micro-wave appliances, regarding their maintenance and their potential danger.

Education

45. The Committee is of the opinion that much education will be necessary, both for the public in general, and specifically for specialized technical staff, if pollution control is to be put on a firm basis. In addition, it appears obvious that a great deal more research is likely to be required for many years to come. We consider that there should be a concerted effort on the part of governments at all levels, of the Medical Profession, and of the Department of Education, to give reliable information to the population about the dangers of, and the cures for, environmental pollution. This program should include the use of all methods of audio and visual education, especially in the mass media, and the introduction into school curriculums of courses related to pollution control, together with essay and art competitions, to encourage interest in this matter of vital concern.

46. We consider that the Medical Profession should encourage research into the long-term effects of minor degrees of pollution. Much is already known about the acute effects, but relatively little about the chronic effects of pollution on health.

47. We can see a need for more inspectors and technicians in this field of pollution control, and consider that programs should be started in such institutes as the Northern and Southern Alberta Institutes of Technology, to offer education to young people who may be interested in pollution control as a career.

Conclusion

48. In general, the Committee thinks that this Province is lucky, in that pollution of all kinds is still relatively light. This has come about, partly because major industry has only comparatively recently become prominent, but also because of the relatively small population; the problems, especially those due to internal combustion engines, have come gradually and

are, even now, not a major hazard to health. In addition to these factors, credit must be given to the Provincial Government for early recognition of the problem, and for the action that has already been taken to control it. In spite of the steps taken by the Province, the Committee, as has been stated before, is of the opinion that standards for control should be Federal standards, and that Federal authorities should have an over-riding power to insist that proper action be taken where this is necessary. It will, of course, be a duty of the Federal Government to use these powers thoroughly and forcefully.

49. So much has been written on this subject of pollution that anything more would seem to be redundant, and legislation is changing so rapidly that this report may well be out of date by the time it is read. Committees by the hundred throughout the world are deliberating on the same matter. If all the words could be directly translated into action, then, by now, there would be practically no pollution, and very little industry, in a starving world. However, sufficient words eventually trigger action from responsible authorities, and quick and effective action is what is needed now, and in the future, if we are to keep within bounds the pollution which is, to some extent, an unavoidable accompaniment to many of the industries that are essential to the welfare of mankind.

50. We are very certain that the control of pollution is not going to be cheap. In fact, if industries are going to be made to conform to limitation which will ensure a relatively pollution-free world, and if they are, as the Committee feels they should be, made responsible for their mistakes and carelessness, then it is going to be very costly, and this cost will have to be borne by everyone in the form of increased charges for goods purchased, and in considerably higher taxation. This fact must be accepted, if words are to give place to action.

Dr. I. D. McIntosh
Alberta Medical Association

Appendix ASRESOLUTIONS ARISING FROM THE REPORT ON POLLUTION CONTROLBY THE ALBERTA MEDICAL ASSOCIATION COMMITTEE ON PUBLIC HEALTH

1. This report on Pollution by the Public Health Committee of the Alberta Medical Association was commissioned by the Association at its 1969 Annual Meeting and presented to the 1970 Annual Meeting in September.
2. One of the main purposes of the report was the education of the members of the Profession and we do not therefore claim there is anything in it which has been discovered by or is known only to ourselves.
3. In our introduction (ref. para. 7) we state: "We are of the opinion that before a licence is granted to any industry a very careful comparison should be made of its ultimate value to the people of the Province against any deleterious effects it may have on land, water and air resources which will be in such increasing demand by a rapidly growing population".
4. (ref. para. 8) we suggest that pollution control standards for Canada should be Federal ones administered by the provinces; they should be Federal in order to eliminate unfair competition for industry between the provinces.
5. (ref. para. 9) although congratulating Alberta on the Environmental Conservation Act, we feel this will have little value unless the E.C.A. has very strong teeth.
6. On Water Pollution (ref. para. 16) we are not happy with the quality of municipal sewage treatment systems but are pleased that recently the Provincial Board of Health has been using its powers in this regard.

(ref. para. 19) we are also concerned that though the Department of Health may have water purity regulations these do not contain effective enforcement clauses.
7. Air Pollution (ref. para. 25) the Alberta Medical Association does not believe that catalytic mufflers and other present efforts to reduce the pollution effects of automobiles will have a measurable overall effect particularly in view of the increasing number of cars on the road. We feel the matter is of sufficient urgency within cities to be kept under constant review by an expert committee reporting directly to the Environmental Conservation Authority.

(ref. para. 29) we mentioned that regional planning commissions either do not have sufficient power or do not use their powers sufficiently. We suggest "proper planning authorities in consultation with health authorities should have complete control subject only to appeal to the Environmental Conservation Authority".

(ref. para. 31) "The Committee expressed concern that much of the air pollution in rural areas like that of thick smoke from flaring oilwells is still legal within limits. Other pollution such as the emissions

of hydrogen sulfide and sulfur dioxide from gas wells and sulfur recovery plants is also legal within certain well defined restrictions. While limits to the permissible amounts of the gasses exist the Committee does not think that present monitoring devices are sufficient in number or quality to detect sudden and short time excesses of pollution above these accepted levels".

(ref. para. 32) "The Committee strongly recommends that complaints should be more quickly investigated; this goal could be achieved by increasing the number of inspectors near major sources of pollution".

(ref. para. 34) we suggest that in the world of pollution there is a good case for reversing the normal tenets of justice by considering a person or industry guilty unless he can prove his innocence. "In rural areas, much major pollution is now caused by recently established industry. The Committee feels that where pollution, which can reasonably be attributed to that industry occurs, and similar pollution has not previously been evident, then the industry should be responsible for showing that it was not the cause of the pollution, rather than putting the onus on an aggrieved person or municipality to show that the industry was, in fact, responsible. The latter can be very difficult and costly, and may well be beyond the means of individuals or local governments, even when the presumptive evidence is in their support".

8. Agricultural Chemicals On the whole the Association feels they have been and are of inestimable value and it is their misuse by man rather than their intrinsic properties which are the cause of trouble.

9. Noise Pollution We know only one proven effect of too much noise - loss of hearing. We feel much more research is needed, but we would also add that industry does not appear to be doing enough to protect its workers and we doubt if many private persons are aware of the everyday dangers to which they are exposed.

10. In concluding our report we say we are of the opinion that although much needs to be done as a Province, Alberta has been going ahead and probably leads the other provinces in its legislation.

11. Arising from the report, the Alberta Medical Association has passed six resolutions:

(a) that the various departments of health consider specific regulations covering the manufacturing and transportation of toxic substances used in chemical and bacteriological warfare,

(b) that there be developed uniform basic Federal standards of pollution control with provincial or regional implementation and control,

(c) that the Environmental Conservation Authority of the Government of Alberta have full powers, punitive if necessary, to see that its recommendations are carried out,

(d) that there be concerted effort on the part of Government at all levels, the Medical Profession, and education authorities, to give reliable information to the population about the dangers of and the cures for environmental pollution,

(e) that the Medical Profession encourage research into the long-term effects of minor degrees of pollution,

(f) that the need for more inspectors and technicians be met by courses and programs in N.A.I.T., S.A.I.T. and the Universities for young people who may be interested in pollution control as a career."

12. In the past, almost of necessity, the Medical Profession, in the field of pollution, has been concerned mainly with the treatment of patients suffering the acute and readily visible effects of exposure to environmental pollution. It is now apparent that in Alberta the Profession has moved beyond this and wishes to become more knowledgeable and more involved in a much wider field. This is evidenced both by the commissioning of this report and by the Association's orders to its Public Health Committee to look more closely into the subject during this coming year. I am not in a position to commit the A.M.A. in any way, but I feel quite certain that if the Alberta Advisory Committee on Pollution Control were to seek the help of the Profession any request would be favourably received by our Board of Directors.

Dr. I. D. McIntosh, Chairman
Alberta Medical Association
Committee on Pollution Control

Appendix ATDISCUSSION ON REPORT ON POLLUTION CONTROLALBERTA MEDICAL ASSOCIATION COMMITTEE ON PUBLIC HEALTHMR. T. A. EDWARDS

I would like to raise a question concerning Dr. McIntosh's last observations and I believe this is a very excellent report. I have read it thoroughly and I would commend its reading to everybody. I find myself personally in agreement with all it said, but after listening to Dr. Smith this morning, I understand that there may be some difficulties inherent in establishing profiles or establishing information or acquiring information about various respiratory ailments or other ailments that result from environmental pollution. My question is whether or not there would be any benefit to the establishment of a central registry, if you like, whereby suspected cases, or cases of this type of disease or ailment, could be reported and recorded, and whether in your view your Association might look with favor in co-operating in this type of exercise or whether this might be construed as interfering with the patient himself.

DR. I. D. McINTOSH

I am of two minds about central registries. Firstly, in theory they are excellent. If you want to know something about a population then record what goes on in the population, and look from time to time to see what is happening. Unfortunately, from a practical point of view central registries are never, ever nearly complete. Cases have to be reported and who is this done by? It is an individual effort on the part of each doctor. We know from experience, and it's not only in the Medical Profession, it's all professions, it's extremely difficult to report everything. For instance the reporting of infectious diseases - not only in this province or Canada, but throughout the world, although it's mandatory, it is very, very sketchy indeed, because we found by experience although it's nice to have the figures in theory, in practice the figures are hardly ever looked at and no research is done on it. I think there would be some merit, but you would have to very carefully select the parameters you want to give a very good reason to those who have actually got to fill out the pieces of paper and send them in, that good and useful use will be made of these.

MR. R. F. COMSTOCK

I read this report and the one thing I found remarkable in it was that every aspect of pollution seemed to be covered except that which might be associated with the operation of the Medical Profession or the Medical field itself, and I am thinking particularly of solid and liquid wastes coming from hospitals. In the case of industries it is quite often the most efficient way of treating wastes is at the source and I wondered if there were any problem associated with radioactive or chemical or infectious wastes coming from medical facilities.

DR. I. D. McINTOSH

Well it was our understanding from the people that we had talked to before we wrote this, that the question of radioactive wastes is extremely well policed, both in this province and throughout Canada. There is no problem at the moment there. As far as hospital wastes go, yes, I imagine there must be an enormous problem the same as there is an enormous problem with all waste, but we couldn't confine ourselves to special things like this.

We really set out with the intention of writing a comprehensive, educational document rather than - there are any number of things you can latch onto, you know. I don't know what the Public Health Committee will do this year. It's going to look more closely at one particular aspect. I don't know what that will be yet.

Appendix AUREPORT ON A PRELIMINARY LOOK AT THE
EFFECTS OF OIL SPILLS ON LAND PRODUCTIVITY

The main purpose of this preliminary study was to determine to what extent, if any, land recovers its productivity with time in areas where serious oil spills have occurred. The areas discussed in this paper, Borradaile, Leduc and Bonnie Glen, received oil spills many years ago and at that time all of the oil that was practically burnable or recoverable was undertaken but no other special measures were taken.

Before I proceed any further with this paper, I would like to make several points abundantly clear:

1. In no sense whatsoever do I consider myself an expert on agricultural matters.
2. The inspections were not as detailed as I had hoped, due to the lateness of the season and some snow cover on the areas inspected and may well be subject to some uncertainty.
3. In two out of three of the inspections, the landowners comments were obtained.
4. In all three cases the inspections were made by the same person.

In order to obtain some scope to the study, a total of three inspections were made in an attempt to investigate various kinds of oil and various kinds of land.

Case #1 This study was in the general Borradaile and Lloydminster areas. The oil is or was quite heavy, ranging from about 10 to 18 degrees A.P.I. and quite sulphurous - 2 to 3%. The time period of the spills was in the late 1940's and early 1950's. Although it would not be accurate to call these spills, it was a case worth examining as considerable oil of this type was involved.

During this period of the oil industry, although no oil production was permitted to be stored in surface pits, waste oil containing considerable salt water, some of it in an emulsion with the oil, mud and sand were permitted to be disposed of to surface pits as the oil was unacceptable to the refineries and it was believed at that time that when sufficient oil had been gathered in a pit it would be burned off. Later when the wells were depleted and abandoned, it was found that only a very small portion of the oil could be burned off even with the use of large quantities of gasoline. The next attempt that was made was to bury the oil by filling the pits with surrounding soil. This also proved to be unsuccessful as within a matter of days the oil would seep to the surface. The last attempt that was made was to fill the pits with alternate layers of straw, soil, scrub bush and more soil. Although this procedure was the most successful, one could hardly

call it a success, as in a matter of months or one or two years a small part of the oil would still seep to the surface once more. No further attempts were made to recondition the areas of these pits. The pits varied in size from about 100 to 300 barrels in capacity and about one acre per pit was affected. There was one pit located at each well or about one every 10 acres. A total of about 50 - 75 acres of land was affected in the Borradaile area and at least double this acreage in the general Lloydminster area. As of several years ago, the Board put through a regulation prohibiting such pits.

At the time the pits were allowed, most of the land was what I would consider to be fair to good and was used for the growth of cereal crops, with some pasture and scrub land.

An inspection of the area in October of this year revealed the following:

1. Some growth commenced about two years after the final clean-up of the areas.
2. There is sparse growth in the areas of concern - estimated to be about 15 to 25 per cent of normal growth.
3. The areas that had been oil soaked are easily distinguishable in most cases by just casual observation. They contain single, thinner straws as compared to clumps of heavier stalks of straw in the immediately surrounding areas. There are a few areas where small oil seeps are still evident on the surface.
4. Some of the landowners have tried to improve the productivity of the areas of concern by fertilization, but at best this has been only marginally successful.
5. A few landowners have noticed a very gradual increase in productivity commencing in the last few years.

Case #2 The Atlantic #3 wild well in section 23, Township 50, Range 26, W4th Meridian.

This well was out of control from April to September in 1948. The oil produced was a medium to light gravity low sulphur oil and it was produced through the well itself and also through numerous craters in the vicinity of the well. In total about 130 acres of land were oil soaked to varying degrees. Some 1.4 million barrels of oil was produced with about 1.24 million barrels of it being recovered by diking the immediate area to contain the oil and continuous hauling by truck and pipe line of the oil to commercial markets. About two days prior to the well being brought under control, a fire occurred which burned off much of the remaining oil and the surface contours were restored to near their original state. Final reconditioning of the site was completed in September 1951.

The land concerned was what I would consider to be some of the best in Alberta for growth of cereal crops.

From our inspection in October of this year, and from the land-owners' observations, the following comments seem relevant:

1. About two years after the well was brought under control, some areas showed sparse growth but the remaining area did not.
2. The area was seeded to brome grass at an unknown time and at present about 70 acres of the area shows sparse growth. The remaining 30 acres is kept cultivated primarily for weed and erosion control.

Case #3 Case No. 3 was a wild well in Section 26, Township 46, Range 28, W4th Meridian. The oil produced was the lightest gravity of the three cases and the flow was directed about 100 feet vertically into the air. During the blowout the wind direction changed a full circle of 360 degrees. The blow occurred in November of 1954 and it is estimated that about 1,000 barrels of oil was released to the atmosphere. The contaminated area was some one-quarter of a mile in all directions from the well and the degree of contamination varied with the distance from the well. Some oil was recovered by flowing it into a pit and trucking it away following the control of the well.

Prior to the blowout none of the area was under cultivation and consisted of scrub bush and medium-sized trees.

Following the control of the blowout an area about 1,000 feet in radius was cleared of all growth. In most of this area no significant growth has reappeared.

During our inspections of the three cases just discussed, discussions were held with District Agriculturists in the areas concerned. It was their belief that if the oil spill was large enough, it would sterilize the land. A member of the Soils Branch of the Department of Agriculture was also contacted and he confirmed this belief, but added that small spills that did not saturate the soil could conceivably stimulate growth. He also commented that within certain ranges of oil saturation, frequent cultivation could reclaim the soil.

This matter was also discussed with the Board's Chief Chemist and he commented that considerable work and several papers have been written on this subject. He also commented that in considering reclamation of oil saturated soil many factors had to be considered, such as:

1. Was the oil sweet or sour?
2. Was the oil asphaltic or paraffinic?
3. The salt content of the oil.
4. The type of soil involved.
5. Depth of saturation of the soil with the oil.

He also commented that the Russians have done considerable work on this problem and published several interesting papers that are available in Canada. A paper entitled "Reclamation of Soil Contaminated with Oil" by R. B. Schmendinger of the Esso Agricultural Laboratory also contains some interesting comments, conclusions and references.

I also understand that Dr. Toogood of the Faculty of Agriculture, University of Alberta, commenced some tests on this problem in 1968 and that some preliminary results from his work will probably become available this coming winter.

Gentlemen, this completes a very general background of the problem which I wished to present. I would guess that this problem exists in total of a few sections of land, say about six as an order of magnitude, in the Province of Alberta with various degrees of seriousness. As far as the Conservation Board is concerned, it has over the years passed new regulations regarding the storage of oil or oily waste in pits. Each change has been to try to reduce the problem, but perhaps further changes are still necessary. In any event, any changes to the regulations at this time will not help the land that has already been contaminated. The operators of the oil wells which caused the spills are in some cases unknown. We can expect some spills to occur in the future as the occasional wild well or large oil spill from pipe line breaks or the like are bound to keep occurring.

In thinking about this problem as a whole, I would pose the following questions for discussion and possible recommendations:

1. Should anything be done about the spills that have already occurred? If so, by whom and what consideration should be given to costs if the operator is no longer known?
2. Should some Government Department or agency be given the task of more or less researching this problem for both existing and future spills and if so what department or agency would be the most appropriate?

If any tangible results were obtained from such studies I am sure our Board would want to reconsider its requirements, particularly in regard to preventative measures and perhaps in regard to reconditioning future spills.

3. As considerable literature is already available on this complex subject, perhaps an expert in this field from an appropriate Government Department should be assigned to do a literature study on the problem with a view to bringing forth a report including recommendations for further action to our next annual meeting.

In addition to these thoughts I would hope some of you may have some others and I would appreciate any discussion or recommendations from the floor.

Thank you gentlemen.

A. F. Manyluk, Deputy Chairman
Oil and Gas Conservation Board

Appendix AVABSTRACT OF A REPORT ON A PRELIMINARY LOOK AT THE
EFFECTS OF OIL SPILLS ON LAND PRODUCTIVITYMR. A. F. MANYLUK

The main purpose of this preliminary study was to determine to what extent, if any, land recovers its productivity with time in areas where serious oil spills have occurred. All of the areas discussed in this paper received oil spills many years ago and at that time all of the oil that was practically burnable or recoverable was undertaken, but to the best of my knowledge, no other special measures were taken.

In order to obtain some scope to the study a total of three inspections were made in an attempt to investigate various kinds of oil and various kinds of land. The three inspections included:

- (1) heavy oil, about 12° API gravity, high in sulphur and salt water on fair to good crop land,
- (2) medium gravity oil on excellent farming land, and
- (3) light oil in scrub brush and small treed area.

In all three cases the areas were considered to be reconditioned between about 1950 to 1955.

The areas were inspected in October of this year. In addition, landowners, District Agriculturists, the Department of Agriculture and the Board's chief chemist were interviewed. Some literature on the subject was also obtained and perused.

I think it would be fair to say that, generally speaking, all of the sources mentioned above gave the same general conclusions as follows:

1. For about two years after reconditioning of a serious oil spill, the land is sterile.
2. After about two years some growth commences to appear in the areas but in the three cases investigated no area had come anywhere near returning to normal.
3. There continues to be a very gradual improvement in the areas with time.
4. No significant attempts at reconditioning the areas has been made other than recovering as much of the spilled oil as possible and recontouring the land.
5. The literature suggests important factors to be considered in reconditioning such areas are: sulphur content of the oil, salt content of the oil, is the oil asphaltic or paraffinic, the degree of saturation of the soil and the type of soil that was contaminated.

The literature also suggests that certain measures can be taken to reclaim such areas.

It is estimated that perhaps some five or six sections of land have been quite seriously contaminated in the Province of Alberta.

The subject of reclamation of such areas is quite a complex one and it is recommended that as a first step an expert in this field from an appropriate Government Department should be assigned to do quite an elaborate literature study on the problem with a view to bringing forth a report including recommendations for further action to our next annual meeting.

A. F. Manyluk, Deputy Chairman
Oil and Gas Conservation Board

Appendix AWDISCUSSION ON REPORT ON A PRELIMINARY LOOKAT THE EFFECTS OF OIL SPILLS ON LAND PRODUCTIVITYMR. H. LEMBICZ

I have worked with Mr. Manyluk and I know that he is carrying out his job to the best of his ability and so forth with regards to oil spills - on the Conservation Board - and recently it is brought to light that considerable oil spills took place in the Swan Hills area and there was another area too, that a lot of oil spills took place, and I wondered what went wrong, just something went wrong there, was there not enough personnel or was somebody negligent on the job that allowed this to happen. There was quite a play in the papers and quite a few people are wondering what went wrong. Could you answer that?

MR. A. F. MANYLUK

I wish I knew what went wrong myself. I would guess that perhaps several factors were involved. Perhaps we had become a little complacent, oil spills had not been much of a problem, and when you become complacent and decrease your frequencies because the record is good, then the record is liable to become bad again and then you're hit with it all of a sudden. Number two, I think you will agree that most of this was discovered in the spring of the year during runoff and my guess would be that a factor at least was that it was an accumulation of very small spills that could not be cleaned up in the winter time, but showed up in the spring, but we are taking steps to have winter inspections done as well as summer and cleanups made wherever it is possible.

MR. H. LEMBICZ

Of course our concern is whether this is something that we've got to expect or is it something that can be cured.

MR. A. F. MANYLUK

We hope to at least improve on it.

MR. W. J. YURKO

I would like to ask Mr. Manyluk if any work has been done as to the leachability of hydrocarbons from the Tar Sands as surface water runs over them and seeps through them and runs into water bodies, whether or not we know if they are hydrocarbons that are leachable. What the products are, how much is leachable, where does it go and how does it end up with respect to the major water bodies in Alberta.

MR. A. F. MANYLUK

Personally, I know of no such studies that have been made by any department or agency or company or what have you, so I am sorry I just can't give you any answers.

HON. MR. J. D. HENDERSON

I wonder, Mr. Chairman, if Mr. Manyluk could elaborate a little bit further on the nature of these oil spills, did there just happen to be some oil running over the ground, was it a long term period of time in which the oil was contacting the ground, what was the exact nature of it?

MR. A. F. MANYLUK Could I ask which oil spills you are referring to please?

HON. MR. J. D. HENDERSON

I think you mentioned Borradaile heavy oil during the course of a brief comment from you yesterday.

MR. A. F. MANYLUK

All three were a little different. We tried to provide a little scope. Borradaile, they were not really spills, as you would normally think of them. At that time it was pre-Leduc, early in the life of the Conservation Board and we permitted certain amounts of waste products, sand oil and salt water to be stored in pits. However, the amount was limited. It was our intention at that time, or our belief, that when the wells were depleted the oil could be burned off and that the pits could be properly reconditioned. When the time came that the wells were depleted we made an attempt to burn the oil off, we found out that it was not feasible. We - in one pit for example, we might use as much as 10 to 12 barrels of gasoline trying to get the thing to burn and it would burn for a few seconds and go out. Don't ask me why, it just wouldn't burn. Our next attempt was, well let's hide it, so we tried burying it with soil. Well this lasted two or three days and the oil was back to the surface, so this was no good. Our next attempt was, well let's dig a bigger pit and we lined the bottom with straw and put a little bit of oil in, a little bit of the product we were trying to get rid of, put a layer of soil in, a layer of say brush in and then a little bit more oil, little bit more soil, little bit more straw until we got rid of everything. This worked for about one or two years, then we started to get small seepages and I emphasize small - they are small - of oil back to the surface and that's the way the thing stands today. I might say that none of these three cases that we investigated resulted from complaints. In no cases have we had complaints on these matters, which rather surprises me.

MR. F. A. VOEGE

How feasible do you consider it is to prevent oil pollution in a drilling rig in water?

MR. A. F. MANYLUK

I think I'm going to have to resort to perhaps a personal opinion here. It is that at the moment it should not be permitted in Alberta. I do believe that we could experiment to some extent in remote areas, where the water is not important, it's more of a slough type thing, and see what kind of success we have on ice, where I think better precautions can be taken, we should move quite slowly before we start permitting drilling on fresh water and at the moment I know of no case since I have been with the Board, which is a little over 25 years, where a well has been licensed to drill on water, so it is not permitted.

Appendix AXREPORT OF THE SURFACE RECLAMATION COUNCIL

Because so much of the surface of land in the settled portions of the Province is owned separately from the minerals and because most of the surface owners do not own any minerals, there became an increasing need for protection from interferences to interests of surface owners created by exploration and operations of minerals.

In the absence of a recommendation from any other Department of the Provincial Government, the Department of Mines and Minerals came up with a proposal and at the 1963 session of the Legislature, The Surface Reclamation Act was passed to come into force on the first day of June, 1963. The Act applies to the surveyed lands in Alberta excepting those within the Rocky Mountain Forest Reserve.

It was anticipated that reclamation requirements would be recommended by the Department of Lands and Forests at the next session of the Legislature, but it was not until five years later in 1969 that its proposed amendment to The Public Lands Act was presented to and passed by the Legislature. The amendment provided for the making of regulations for the conditioning, maintenance and reclamation of the surface of lands used in mineral and pipe line operations in unsurveyed lands and in the Forest Reserve. The regulations came into effect on October 3, 1969 as Alberta Regulation 301/69.

The Surface Reclamation Act provides that a reasonable standard throughout the surveyed portion (about 45%) of the Province be required for the conditioning, maintenance and reclamation of the surface of lands used for wells, batteries, pipe lines, mines and quarries even though the operator and the surface owner between themselves may agree to a lesser standard.

It is acknowledged that the agricultural capabilities of the lands involved will be lessened. There are some who feel that top soil should be transported from other land to the mineral area to a depth similar to that existing before the operation commenced. This is not contemplated because the land from which the top soil is obtained would then be reduced to a subnormal condition.

There is no interference with the terms and conditions of private agreements with the exception that maintenance of the surface during the period of use of the land and reclamation of the surface at termination of the operations must meet the reasonable standard.

The Act establishes a Surface Reclamation Council which consists of members appointed by the Council of the county or other municipality and by the Minister of Municipal Affairs in the case of an improvement district or special area. These local members may act within the municipal jurisdiction for which they are appointed. Other members of the Council are appointed by the Lieutenant Governor in Council and are called government members. Currently there are 42 local members and 10 government members.

With respect to any inquiry that may be conducted by Council, it must be conducted by two members of the Council. In most cases Council will consist of one local member and one government member. In the event that a local authority does not appoint a member, or the local member is unable or declines to act, then the two members of the Council are selected from those appointed as government members.

During the period that the surface of land is held for the well, battery, pipe line, mine or quarry, the Council may issue an order directing the performance of any act necessary

- (a) to condition, maintain or reclaim the land,
- (b) to destroy or prevent the growth of noxious weeds or weed seeds,
- (c) to remove or remedy any hazard to livestock or to the conduct of farming operations, or
- (d) to install or repair any fence, gate, cattle guard, culvert or other thing.

Whenever there is failure to perform the work directed by the order within the time specified, the Chairman of the Council causes the necessary work to be done. The costs incurred are paid out of the General Revenue Fund of the Province and are collectible from the person to whom the order was given. During the seven and one-half years the Act has been in force 1,226 orders have been issued for the performance of work.

Where a surface lease has been given by the owner of the land, or the land has been expropriated whether through the Right of Entry Arbitration Board or the Public Utilities Board, the lease or order cannot be terminated until a reclamation certificate is obtained from the Council. 13,104 certificates have been issued involving 12,429 wells, 171 batteries, 476 pipe lines, 22 mines and 6 quarries.

In review I would mention that the Emergency Coal Production Board was established in 1942 under the War Measures Act of Canada for the taking of whatever measures were necessary for maintaining and sustaining the production of coal and ensuring an adequate and continuous supply during World War II. The Board was empowered to financially assist the operation of existing mines and to finance new coal mines. The projects sponsored in Alberta by the Federal Government produced some 853,000 tons of coal and while the total cost involved is unknown, the operations resulted in a net loss to the Federal Government of 1.4 million dollars.

The acreage involved in strip mining for coal in Alberta prior to the coming into force of The Surface Reclamation Act in 1963 totalled 3,480 acres which includes the acreage attributable to coal mining in Alberta before the transfer of the resources to the Province in 1930 and the strip mines financed by the Emergency Coal Production Board.

Since 1963 some 1,280 acres, the equivalent of two sections of land, have been involved in strip mining. The operators of these mines must carry out satisfactory reclamation programs. In some instances deposits of gravel overlay the coal. Action is being taken to conserve any commercial sand and gravel meaning that the final reclamation may be delayed a year or two. Some ponds of water in strip mining excavations have already been stocked with fish by local Fish and Game Associations in conjunction with the Fish and Wildlife Section of the Department of Lands & Forests. The particles of coal do not seem to have interfered with the normal growth of these fish.

Yesterday there was a comment, if I may, Mr. Chairman, having to do with fires outside of homes. I would like to mention that at the 1968 session of the legislature an amendment was made to the Forests Act and the new section 65A prohibits any outdoor fires in any part of Alberta without a fire permit during the fire season. Now the fire season is defined as commencing on the first of April and ending on the 31st of October unless it is extended by the Minister of Lands & Forests.

Within a municipal district, county or special area, a fire permit would be obtained from a fire guardian appointed by the municipal jurisdiction. In the balance of the province a permit would be obtained from a forest officer.

Mr. H. H. Somerville
Deputy Minister
Mines & Minerals

Appendix AYREPORT ON ENVIRONMENTAL CONSIDERATIONSIN THE ISSUANCE AND ADMINISTRATION OF A LEASE FOR COAL MINING

Past coal mining operations in Alberta as elsewhere were carried out with little consideration for other resources or the environment. Regulations dealt primarily with mine safety and maximum removal of coal. Many of the old mines were located on lands also owned by the mining company, so little attention was paid to reclamation.

Mining companies now come under more stringent regulations requiring reclamation on private as well as public lands. The companies must comply with the Coal Mines Regulation Act, the Water Resources Act, Health Act and Regulations, the Fisheries Act, the Public Lands Act and the Forests Act.

Within the Forest Reserves and unsurveyed lands of the Province, the companies must comply with the Public Lands Surface Reclamation Regulations. Within surveyed lands outside the Forest Reserves, the companies must comply with the Surface Reclamation Act.

In negotiating a lease, meetings are held with the company and the various departments concerned. The company presents their proposal. This is generally followed by a field inspection of the proposed site after which the company is advised of those areas in which a modification of plans is required before sanction could be given to a lease. This may be followed by further meetings until mutually acceptable terms can be reached. If an acceptable agreement cannot be negotiated, the company may file an application with the Right of Entry Arbitration Board. The various departments concerned would then make their representations at a hearing before the Board.

If the company chooses to obtain an order through the Arbitration Board, the Reclamation Act and Regulations would still apply. The following are some specific terms and conditions which might be considered in a Lease:

I. Mining Area

1. Timber salvage is (is not) required due to merchantable volume.
2. The company shall, before operations commence, submit to the Minister a plan showing the number of acres to be disturbed by mining or spoil disposal.
3. Areas to be mined shall be cleared of forest cover and resulting debris shall be disposed of by burning, unless otherwise authorized by an Officer of the Minister.
4. Debris disposal on spoil areas (dump areas) will be permitted by cutting or flattened by machinery and covering same with a minimum of (x) feet of soil and/or spoil.
5. Where practical, soil shall be stockpiled and spread on top of back-filled pits, to facilitate revegetation.
6. No overburden, rock or waste material may be deposited in standing timber and a strip (x) feet in width free of debris shall be maintained

- between the toe of the spoil pile and standing timber.
7. Slopes of cuts and fills shall not exceed a _____ slope.
 8. The company shall prepare and submit to the Minister for approval a reclamation plan, which shall include:
 - (a) A description of the methods and specifications for grading.
 - (b) A description of the methods and specifications for revegetating the area by seeding or planting of grasses, legumes, shrubs or trees.
 - (c) A plan at a scale of 1" = 400 feet, showing the location and area of the lands to be reclaimed.
 9. When lands cease to be used for mining operations, the lessee shall commence reclamation of same within the _____ period thereafter and shall proceed with same to completion in accordance with the plan approved by the Minister.

II. Roadways and Power Lines

1. Complete debris disposal is required.
2. Timber salvage may or may not be required.
3. Road backslopes not to exceed (x) in soil.
4. Stream crossings shall be at right angles to the stream.
5. Bridges and culverts shall be of sufficient size and constructed and installed so as not to impede or obstruct the normal stream flow. Where required, riprapping or other stabilization measures shall be taken.
6. Ditch relief cross-drains shall be provided as slope erodability of soil necessitate, to achieve adequate drainage and to prevent erosion.
7. All cuts and fill slopes are to be stabilized by revegetation. The slopes are to be seeded to a grass/legume mixture approved by the Department with fertilization and mulching where necessary.
8. Seeding is to be carried out during the first growing season after construction. Additional treatment will be required on all seeded areas where the established ground cover is less than 80% at the end of the second growing season.

III. Reservoirs

1. The flood area at full supply level is to be established on the ground and all timber cleared from the flood area and a strip (x) feet in width outside the flood line.
2. Salvage of timber may or may not be required.
3. Complete disposal of resulting debris is required.
4. Dam structures are to meet with the approval of Water Resources. All artificial embankments must be stabilized by riprapping, revegetation or other measures.
5. No deleterious substances, as defined by the Fisheries Act, shall be allowed to enter a reservoir.
6. You shall obtain from the Water Resources Branch a licence for all stream diversions, reservoirs, etc.

IV. Slurry Disposal

1. The area required for slurry disposal shall be determined in accordance with the requirements of the Department of Health.

2. The area to be used is to be established on the ground and all timber cleared from the area and a strip (x) feet in width outside of it.
3. Salvage of timber may or may not be required.
4. Complete disposal of resulting debris is required.
5. Plans of dam structures are to be submitted to and approved by the Department of Lands and Forests and Water Resources before construction commences.
6. All artificial embankments are to be stabilized by riprapping, revegetation or other measures.
7. Effluent from slurry disposal shall be controlled in accordance with the requirements of the Department of Health.
8. The slurry disposal area shall not be abandoned in a condition which may result in harmful effects to the stream.

Once the company has a lease or Right of Entry Order, the operation is frequently inspected by an Officer of the Department of Lands and Forests. Periodic checks are made by other divisions to ensure that their resources are not damaged any more than is necessary or that their regulations are being complied with.

In the issuance and administration of a lease, air, water, soil, forest, wildlife and people are our prime consideration. We know that you can't extract one resource without affecting one or more others. What we are attempting to do is minimize the damage to other resources, by agreement, education or finally by enforcement.

Mr. J. Markovich
Department of Mines & Minerals

Appendix AZDISCUSSION ON REPORT OF THE SURFACE RECLAMATION COUNCILAND THE REPORT ON ENVIRONMENTAL CONSIDERATIONSIN THE ISSUANCE AND ADMINISTRATION OF A LEASE FOR COAL MININGPROFESSOR PAUL LEWIS

I'll direct my question to Mr. Somerville. You mentioned that in relationship to the surface reclamation, that there had been 22 mines that had been awarded reclamation certificates and there was other reference to approval of reclamation activities. I wondered if you would be willing, sir, to elaborate on what criteria are used to determine whether or not this reclamation has been satisfactory.

MR. H. H. SOMERVILLE

Well basically the criteria is related firstly to the nature of the area. If it is in an area that is involved with muskeg, you will have a separate set of circumstances apply than you would in agricultural land. In the same way if it is grazing land with shallow top soil, there will be a varying set of conditions. Now under reclamations, it is recognized that the land is not restored. Reclamation relates to doing the best with what is there and available. As I mentioned there is no move to transport top soil from one location into another because when you do that, then you have two locations that have been partially affected. The one other feature that I might mention is that when the mineral operator undertakes his operations, he must either obtain a surface lease from the surface owner or he must obtain an order of the Public Utilities Board previously and now it is the Right of Entry Arbitration Board.

In setting the compensation, whether it is in the surface lease or whether it emanates from a Board, there is an amount of compensation that is related to the amount of land that may be permanently damaged, so initially the surface owner does get some compensation for land that may be expected to be damaged or partially damaged.

PROFESSOR P. LEWIS

In a document that I received from you that listed the number and location of mines in Alberta, there were some 1,760 mines that were listed as abandoned. What I would be curious to find out is what differences are there between a mine that has been abandoned and one that has received one of the reclamation certificates. What would constitute a difference and whether or not a mine that was abandoned or that was phased out would receive a reclamation certificate or not. I grant you there are different areas that are involved and different conditions that apply, but could you give me perhaps a specific example. I can't quite follow the generalities that you have indicated.

MR. H. H. SOMERVILLE

Well if we were to take some of the older operated areas, you may find that the degree of reclamation is comparable with what you might get

with a new mine now, but there are - of the number of mines that have been mentioned, there are some of them that it is difficult to find the actual location on the ground and an effective program of reclamation has been carried out, whether it has been by nature itself or nature assisted by some individuals.

MR. G. PEEL

I would like to direct a couple of questions to Mr. Somerville. One thing I would like to know, he has quoted figures on the acres that have been involved in strip mining up to now. I would like to know how many acres are currently under permit for strip mining development, or exploration. Secondly, I would like to remark on the Surface Reclamation Act as he expounded on it, it would appear to me it protects the wheat problem for the farmer and a hazard to cattle, but going much further than that when we get into mountainous slopes I am afraid there isn't a lot of protection from siltation involved in the Surface Reclamation Act as I see it. I also note that Mr. Somerville made remarks about fish being able to live with coal. We are quite aware of this, we have been involved in some restocking problems, but the part I'm talking about now and I have a book here to support me of a study done in the Grand Cache area, we are not talking about fish living with coal, we're talking about fish living with siltation from overburden and I would like to hear some answers on that.

MR. H. H. SOMERVILLE

I am sorry I cannot come up with the answer as to the number of acres at this time, but with regard to the mountainous areas and the conditions involved there, they do not come within the Surface Reclamation Act and I am sorry I cannot answer anything about the mountainous or the foothill sections that are wooded or unsurveyed.

MR. G. BARNES

Touching on the question Mr. Somerville was asked, I would like to say that from my knowledge of the companies that I represent, it is possible that there may be a total of 8 or possibly 9 mines located at approximately 50 mile intervals along a 400 mile front and this is the mountain front, and each mine would occupy a maximum area of 2-1/2 square miles or about 25 square miles in total. This represents about 1/6 of 1% of the 15,000 square miles of foothill belt and about 1/20 of 1% of the total forest area of western Alberta, which amounts to about a total of 46,000 square miles. These figures appear to indicate that coal, the open cast mining coal, is not likely to be a significant factor even with the developments we see.

MR. H. LEMBICZ

I want to get the record straight. I do have a little comment and question as well. It has been remarked by some of the government officials that some conservationists, and the Fish & Game Association is the largest group of conservationists in Alberta, if you look at that map 14,000 square miles of that area with no development in it and this is wrong, we only ask for wilderness areas, small wilderness areas through that area with no development in it. Now the point I want to make, we are very concerned about that area. As you will note, it is within our recreational area and more so

our greatest water conservation area, and we want to know, we want to have the development that takes place there done in such a manner that it is not going to destroy that area for water conservation or recreation, any more than is at all necessary and if there was a question I would like to ask it is - what regulations have we got in regards to strip mining or any other mining in that area. What is the government - what is going to take place - this is very vital to us and we would like to know.

MR. J. MARKOVICH

There are several - you have your Water Resources Act, dealing with the diversion of streams, you have your Public Lands Reclamation Act dealing with public lands and you have your Health Act dealing with siltation of streams, you have your Federal Fisheries Act which also covers certain aspects of streams. I believe there is another one - of course the Coal Mines Regulation Act also covers certain aspects of it.

MR. H. LEMBICZ

What does it say?

MR. J. MARKOVICH

I'm sorry I haven't them with me. In effect the Public Lands Act, the one I am most familiar with, says that - something to the effect that no disturbance of the surface on public land may take place without the consent of the Minister and then after the disturbance has taken place, you have your Reclamation Regulations and Reclamation Act which would apply.

MR. W. J. YURKO

Well, I do have one comment. I think the figures that are quoted are very misleading indeed. It seems to me that the figures indicate the actual area strip mined, but this isn't the actual area disturbed by a long shot, when you consider roads and townsites and power lines and everything else that goes with the mining complex, and I think it would be more appropriate if total area figures were also given, rather than only the area that has been mined. The questions I have are two basically. I am interested if there are regulations with respect to the actual exploration techniques that are used, or do we depend entirely on ripping with a bulldozer and if these regulations vary from area to another and with respect to terrain. The second area that I am interested in is that if there is variation in regulations with respect to the composition of the coal, which we do know in certain areas, particularly with respect to the sulphur content of these fuels, and the leachability of the sulphur from the coal deposits in the various areas that exist in the eastern slope of the Rocky Mountains. The third question I would like to ask, if a composite summary has been done on all the legislation in the United States with respect to strip mining of coal.

MR. H. H. SOMERVILLE

Well I believe that roads and power lines are used for other than the mining industry, even in the foothills area, so I think that it would be unfair to add up all the roads and all the power lines and all the other types of communication and charge it to one particular industry. Now it is true that there are variations in terrain and in the mountainous areas you get into tilted seams, whereas in the plains areas you get into flat seams. Dealing with the sulphur content, I don't think there is any coal in Alberta that will rate higher than .3 of 1% of sulphur compounds and this is very low, it's about 1/10 of some of them in the eastern United States, so as far as leachability is concerned, of our coal, there will never be the adverse effects that have been involved in Kentucky and those areas where the coal carries a high degree of sulphur.

MR. P. E. DUBY

I understood Mr. Somerville to say that no attempt is made to restore top soil in strip mining. Is this correct?

MR. H. H. SOMERVILLE

It is true that there is no restoration. It is bound to happen that the top soil will become mixed with the subsoil, but unfortunately in a lot of the areas, where strip mining is undertaken, there isn't too much top soil to start with.

MR. P. E. DUBY

As you may know, I am a farmer, in farming operations on irrigated land, we often find it necessary to level our land and in some cases quite extensively, well in many cases we find it necessary, the first operation is to strip the top soil and stock pile it. This is a fairly expensive operation, but in some cases it is necessary and I was wondering why this couldn't be done in strip mining, because if it is not done, especially where you have a shallow soil, well you're not going to have much of a place for plant life to grow following your operation and it is not necessary to deplete other areas by taking top soil from there. It seems to me that you could stock pile your top soil and then put it back after you're through.

MR. H. H. SOMERVILLE

Well I think that is true. You're talking about an area that has an abundance of top soil and in some areas you may have top soil, grey wooded soil, where it relates to an inch or an inch and a half and even in conserving that you're bound to get some of the deeper soil involved with it.

PROFESSOR P. LEWIS

I just have a comment to make with respect to that last question. It seems to me that on the surface of it removing the top soil and stock piling it and then taking overburden off, then removing coal, and putting the overburden back and then replacing top soil sounds like a good idea, but in mountainous areas it seems I think that when your overburden is put back and the top soil replaced on top of it in a relatively limited amount that it doesn't take very much precipitation to wash this condiment of top soil right down through, so it is lost anyway. It seems to me this is a serious problem.

MR. D. C. WIGHTON

Before a strip mine is placed into operation, is the location and the size of the operation made public? Can this information be made public before it goes into operation?

MR. H. H. SOMERVILLE

Yes, before a mining operation may be undertaken, you must get a permit to open from the Director of Mines and the information is available to anybody regarding any mine that is open, from the office of the Director of Mines.

Appendix BA

REPORT ON POLLUTION PREVENTION

IN THE ZAMA AND HAY LAKES AREA

Mr. Grossman and I touched bases briefly before our talks, but I think both of us have made some last minute amendments and you may find that there is a little bit of duplication, but I hope you will bear with me. What I want to do is spend a little more time outlining the specific conditions that the Board applies to drilling and producing operations in this very sensitive area.

This is a brief description of the special pollution control requirements which apply to drilling and producing operations in the Zama Hay Lakes Area. This area contains two valuable natural resources, migratory game birds on the lakes and oil and gas at a depth of about 5,000 feet. The area surrounding Zama and Hay Lakes is a flood plain from the Hay River and covers some 470 square miles. It is a major duck and geese staging area for both the Central and Pacific fly-ways. When the water level is low enough, it is also a major breeding area for ducks and local geese. Bird counts on the lake have shown 200,000 geese and a million ducks present at one time. The lake area also is part of the very large Rainbow-Zama oil field Reef Complex. The whole complex contains some 500 wells, 1.15 billion barrels of oil and produces some 85,000 barrels of oil (and 80 million cubic feet of gas) daily. The lake area contains about 70 wells which produce 6,000 barrels of oil per day. Here is a text book example of two important resources which occupy the same area of the province.

The first proposal for drilling on the lake area came in 1967 and at that time the Department of Lands and Forests, the Water Resources Division, Pipe Line Division, the Board and Shell Oil Company held meetings to draft suitable conditions to protect the lake and wildlife during drilling and producing operations in the area. These special conditions became a part of the drilling licence issued by the Board and are enforced by the Board and the Department of Lands and Forests. The conditions are now outlined in the Board's Interim Directive No. 69-3 which has the same effect as a regulation. The special requirements are divided into three major areas; those pertaining to drilling; to production; and to general operations in the area.

Drilling During the drilling of the well, the operator must run, in addition to the usual surface casing string to a depth of 300 feet, (now increased to 600 feet) an extra string of casing to at least 3,000 feet. The casing is run before any possible oil or gas zones are encountered and is of sufficient length so that the well can be closed-in against any flow or pressures expected. If a blowout does occur and if it appears that the oil will pollute the lake, the Board may require the well to be set on fire immediately. All drilling fluids, drilling cuttings and any waste produced from the well is contained in tanks and later trucked to pits which are located in approved areas outside the lake. The drilling site is dyked with a 30" dyke to prevent escape of fluids. If drilling takes place on the ice, a 4" cover of gravel or sand is first placed on the ice and scraped off after the completion of the well. No drilling operations are allowed between April

1st and July 1st, when the high water could result in widespread oil contamination if an accident should occur.

Producing Another set of special requirements applies both to the well itself and to the oil and gas handling equipment and storage tanks which are built to serve the wells. This arrangement of equipment is called a battery. It is built on a pad which has a surface elevation at least two feet above high water level. The storage tanks are surrounded by a dyke and the tanks equipped with an automatic control to prevent them from overflowing. Any pressure relief lines or drain lines lead to a tank where the oil can be contained. If a flare pit is constructed, it is lined with clay and kept clean and dry at all times. When gas is separated from the oil, it is burned in a 40 foot flare stack to reduce the ground level concentration of sulphur dioxide which might have an effect on plant growth. All pressure vessels are equipped with automatic controls which will shut down production to the vessel if high pressure develops inside the vessel. All producing wells are equipped with automatic valves to close in the well if an oil leak develops.

General In addition to special precautions for batteries and wells, there are a number of precautions relating to operations in the area generally. In order to cut down a number of batteries that might be built within the area, the Board restricts building of batteries to one in each quadrant of a township. Wells and batteries are checked daily. Oil spills must be reported to the Board immediately and cleaned up immediately. The company is required to present a plan to show the procedure and equipment which will be used for control of oil spills on the water. In addition to the spring shutdown of April 1st to July 1st, a second shutdown period is enforced in the fall during the staging of migratory birds so they will not be harassed by the operations.

The drafting of these special precautions has been an outstanding example of co-operation between industry and Government. Each Government department supplied important expertise in its own specialty to produce the best regulations possible. The oil company primarily involved in development of the lake area was most thorough in its initial investigation and supplied valuable data and guidance to the Government departments while the regulations were being drafted. It has been our experience that all the companies who are operating in the area have taken the utmost care to ensure that no accidents will occur and have demonstrated that it is possible to develop an oil field with minimum impact on a water covered wildlife habitat.

V. E. Bohme
Development Department
Oil and Gas Conservation Board

Appendix BBDISCUSSION ON REPORT ON POLLUTION PREVENTIONIN THE ZAMA AND HAY LAKES AREAMR. H. LEMBICZ

The question I would like to ask is have there been any observations made by biologists and so forth as to how the wildlife - the birds and so forth - who are using this area, are they using it as they did in its natural state or do they - have numbers receded since this operation has taken place?

MR. V. E. BOHME

I talked to Gordon Kerr, who is the wildlife biologist with the Department of Fish & Wildlife, just before this meeting started and he had been up there two or three times this year and has written a report on the area. He said that he was quite happy with what he saw up there and I don't really know whether he was up there in a time when he could make any bird counts, so I'm not sure.

Appendix BCREPORT ON TESTING OF DUAL FUEL VEHICLES

I am here representing the Canadian Gas Association. My employer is presently testing the dual fuel vehicle and we have planned this winter on having five units being tested and we have received verbal permission from the Public Utilities Commission to go ahead with limited testing and not concern ourselves about how the fuel use or road tax or whatever you have would be collected.

However, our concern is, assuming all things being equal, and these tests prove out the way we feel they will, within about 18 months or so we would like to possibly do a major conversion on a number of our service vehicles in the City of Calgary and possibly in the City of Edmonton and in order to do so we are wondering if this subject has come up before this group before, as this is my first meeting as a member of this committee. If the subject has come up whereby any legislative suggestions have been made to the Minister or to the Provincial Government suggesting modifications to the fuel tax as it now stands.

I might say that we have checked into, in for example the State of California they have just passed legislation recently giving until 1975, at least until 1975 there will be no fuel use tax put on liquid natural gas or compressed natural gas. Now this, of course, is what you might call promotional legislation so that more and more people, particularly people with large fleets of vehicles would convert their vehicles to either propane or liquid natural gas of some type or compressed natural gas and I am just wondering if there is anybody at this committee could make any comments regarding this, or if this is a good sounding board to discuss the subject so that new legislation might be forthcoming to be brought into effect in the next year or year and a half.

Gordon Cameron
Canadian Gas Association

Appendix BDDISCUSSION ON REPORT ON TESTING OF DUAL FUEL VEHICLESHON. MR. J. D. HENDERSON

Might I ask whether Mr. Cameron's company has looked into the insurance implications of doing this - automobile insurance?

MR. G. R. CAMERON

Mr. Chairman, the system we are presently using has received all of the approval and has all of the safety features on that goes through whatever insurance group and underwriters in the U.S. and it has been in use and been tested down there in California for some time now, and so I would say in answer to your question, Mr. Minister, yes - I don't believe there will be any problem there because the underwriters are quite satisfied with it in the south, and there are a number of other places I think in Canada that are trying it out at the present time and our people who did go down to California to check this out said that they came back with the answer that there were no problems as far as safety was concerned. Now I could go into that in more detail if you want, as far as the physical aspects are concerned, but it is a very safe type of operation. In fact, considerably safer than the normal gasoline. And as I mentioned, this is a dual fuel system, which would operate in the city in the congested areas under natural gas and once it left the city and was out on the highway could convert to gasoline.

MR. T. A. EDWARDS

Perhaps Dr. Ball would be better qualified to comment on this, as the topic about encouraging the use of this type of fuel was the topic of a discussion in our subcommittee, that is the Edmonton Air Pollution Subcommittee and my recollection of the discussion was that the Minister be asked to consider what incentives might be granted either by way of tax, or price advantage, to this type of thing to encourage the adaptation to systems which would use other than the normal gasoline. But this has been the topic of a discussion in our subcommittee.

DR. G. H. BALL

Mr. Chairman, I believe yesterday morning in the recommendations that came up from our subcommittee, there was reference to this matter. We've spoken and discussed this matter at some length both within the subcommittee and within my own department. We have satisfactorily assured ourselves, I believe, that this is something which warrants serious consideration, experimentation, and maybe adoption within our urban communities and I know that I speak for the committee and for most of the health authorities when I say that we support this kind of venture very, very strongly, sir.

MR. H. KRUSCHE

I have written up the subject three times on the main committee and the subcommittee, we have discussed it at length and I wrote to the attention of other subcommittees as well. The technology exists at least sixty years.

The whole issue is strictly political. We are exporting, giving permits to export propane to the United States about 5¢ a gallon, the oil companies in the winter are said to sell it here in Alberta because they are geared to produce gasoline, but this would take away the market from the installed installations. This is a very complicated business, it has nothing to do with technology, the technology I say has been known all over the world and it is up to the politicians to decide whether they will give us a go ahead in converting to propane or natural gas or not. Natural gas has to be compressed and liquified, the idea to start with natural gas as a liquid came from the time since United States started to import liquified natural gas in a form of a liquid from Venezuela and from the far East and we would have to compress it and liquify, which costs money and on the other side we have about five stations of propane between Edmonton and Calgary, we could buy liquified propane, the business of insurance and safety could be coped with easily, the same way we are dealing with pesticides and insecticides, dynamite on the streets and anything else which is much more dangerous to handle than liquified propane.

HON. MR. J. D. HENDERSON

Are there any legal complications to doing this or is it really incentives you are talking about?

MR. G. R. CAMERON

No, there are no legal complications that I am aware of, I merely am pointing out the fact that I believe within the next year and a half there will be a considerable number of vehicles which will either be propane powered or on this dual fuel system we are talking about and in all fairness to you, sir, in order to get your pound of flesh on the fuel tax, it is a case of how is this to be done. It requires legislation to say how you are going to tell how much natural gas I have run through my vehicles compared to gasoline and since we have brought these cars out and shown them to the public, we have had a number of calls asking if we would convert people's cars, regardless of the cost to put this system in and they have asked us what it would cost to get a small compressor they could hook on to their gas line in their house and these are the things that could create, give you, sir, a lot of headaches, because you're going to have somebody bootlegging gas out of their kitchen range through a little compressor and you won't be able to catch them doing it, and this is why I bring it up, I think that it's not a case of anything other than the fact that if there is no legislation, it's coming about anyway, and I would just like to have this group go on record as being aware of it and do anything we can to help you produce that legislation.

Appendix BEMOVING PICTURE ON AIR POLLUTION IN THE CITY OF CALGARYDR. E. TOLLEFSON

I am going to call on Dr. J. J. Havlena who has really done the work involved in getting this film. He would like to say a few words in presenting this film. It is a silent film and then, providing we don't burn a bulb out in our projector, you will see what happens over Calgary on certain days.

DR. J. J. HAVLENA

We would like to show you some results of monitoring of air pollution over Calgary using a time lapse movie camera. Using this camera, we have taken a picture about every sixty seconds. Information gathered during the course of a morning in this way may be compressed into about a minute.

Pictures were taken from two locations - one on the North Hill at the Calgary Winter Club, the other from the south side near the C.I.L. plant along the Bow River. What you are about to see are ten sequences taken in August, September and October of this year, under various meteorological conditions.

Qualitative evaluation shows the development of a pollution cloud over the city coincident with the morning traffic rush. You will observe how this cloud builds up and later in the morning disperses with the heat of the sun. You will also note certain emissions from stacks indicating the possibility of using this technique for spotting polluters. The effects of inversions in trapping pollutants over the city are clearly visible in some of the sequences. There are three sequences showing the effects of a forest fire on visibility during the period August 21st through 25th.

Meteorological data have been spliced into the film for scientific purposes. We will try to indicate some of these data as the film runs.

We think that by seeing these pictures, you will realize that Calgary is developing an air pollution problem which we think requires research.

DR. E. TOLLEFSON

We find this a very useful scientific film. I have written a short paper on the automobile as a cause of pollution in Calgary and I came to some conclusions based on some work done down in the Los Angeles basin area, suggesting that at about 50°F you should not be seeing this cloud, if this is photochemical smog, but some of these pictures you have seen were taken at temperatures between 30 and 50 degrees, mainly 30 to 40, so we seem to have something different here and I think it is something that deserves study, when you consider that the population of Calgary is now about 385,000 and is going up to 700,000 by 1986 and if we get a proportional increase in the number of motor vehicles, I don't know just how bad this problem is going to become unless we get a mission control device.

Appendix BFDISCUSSION FOLLOWING MOVING PICTURE ONAIR POLLUTION IN THE CITY OF CALGARYPROFESSOR R. W. LONGLEY

I wish to come back to the problem which I spoke about yesterday and that is the matter of the gas plant around the countryside. I should have brought it up when we talked about research yesterday, but I hadn't got my thoughts clear enough in order to bring it up at that time and I apologize for doing it at the present time.

A year ago, as you will remember, I recommended that we get in touch with the Suffield Experimental Station, or D.R.E.S., in order that they may help us do some research. After I spoke yesterday, I learned something that I hadn't known beforehand - learned two things - one is that I can easily get the material from - that I was looking for regards to pollution - from Mr. Grossman, but Mr. Bohme also spoke to me and said that they had a method of when they put up a gas plant or when a gas plant was supposed to be put up, there was an investigation and out of the investigation they arrived at a conclusion with regard to the location and also the height of the stacks. I asked him what the situation was, how did they come up with the conclusion, he said that they had a formula by which they worked in order to get an answer for the concentrations that they would get. I asked him where they got the formula, he mentioned that he gave it a name, he said it was an imperical formula and I asked did he know on what basis. He wasn't fully cognizant of this. One of the things he did not know - and this is where I come at the present time - he did not know whether the formula was related to sulphur dioxide which is the gas that we are particularly concerned with. Herein I think we must do some research, because if the formula that we are working on is based on insufficient data with regard to Alberta, then we are making a mistake I feel. Sulphur dioxide is a different compound from what most of the gases we release. It is much heavier than air, and it subsides into hollows, the people from the Suffield Experimental Station, I spoke with them about it, and they said they didn't know the diffusion of sulphur dioxide. This was a compound that they had not worked with.

I think we have, in Alberta, very serious conditions of sulphur dioxide that we are not learning about. These are conditions where you have a very severe inversion and where you have irregular topography, so that the sulphur dioxide can move down into the low lying areas and in this way we get the large concentrations that we don't know about. When this matter came up yesterday, Mr. Dobko commented that he had spoken with the Suffield Experimental Station and said that they would be willing to do some research on this, but he said it was a matter of money and it is a matter of money, it is not a matter only of money in view of the research to be done, it is also a matter of money in the view of the plants that are being put up and of the farmers around. If the regulations that have been made by the Gas Advisory Board are too stringent then the gas plants are putting into their gas plants too high chimneys or too strict regulations and they are spending money for this. If they are not stringent enough, then the farmers in the vicinity are being, are having damages, corrosion

results and other results which we don't know about, because we are not making strict enough regulations. I would like to recommend once again, as I did last year, that we get in touch with Suffield Experimental Station and in this case I will make a specific - ask them to study the diffusion of sulphur dioxide under conditions of light winds, extreme inversion and an irregular topography. Again I apologize for bringing this up at this time, but I feel it is something that hasn't come up and I think it should be brought up at this meeting of the Advisory Board.

MR. T. A. EDWARDS

My comments really relate to the report on the Committee on Education this morning. There wasn't enough time, as I recall, to completely exhaust the comments from the audience or the questions and the points I would like to make are these. This committee that we presently serve on is really an educational committee. The educational subcommittee is part of it, of course, but I am somewhat disturbed at part of this, and being concerned about pollution or the ecology, to be suspect insofar as schizophrenia is concerned, but be that as it may I am inclined to suspect that some of those who are charged with the responsibilities in these matters suffer from a slight paranoia and one good psychiatric term deserves another.

Now having that off my chest, it does point up my message and that is we seem to - in this whole area - be developing into an antagonist-protagonist type of relationship, and this in itself is a very bad type of an atmosphere in which to conduct any type of study or any type of activity. We are all on the same side of the fence regardless of whether it is fish and wildlife or the Chamber of Commerce, or natural gas or what have you. I think we all have the same basic aspirations and the problem really that is dividing us, or giving this false impression of antagonism and protagonism, is the lack of leadership by authorities in the educational field. Most of the publicity, most of the startling facts, most of the waves are caused by, and I am using this respectfully, the ad hoc groups, the pollution control groups, the university interdisciplinary group, this type of thing. These groups are excellent and they are needed. Surely what is really required is an identification with government, insofar as education is concerned, and I'll give you a couple of specific examples. I spoke about this at this meeting a year ago. We spend a great deal of money in educating our citizens as far as forest fires are concerned, keep our forests green, they're painted on the highways, Smoky the Bear, this type of thing, the same type of promotional campaign is not identified insofar as the government is concerned. There is an awful lot of mileage in the media, in the newspapers, but by other groups, by amateur groups if you like, by special interest groups, but nothing from the government which really people look to as being primarily charged with looking after their interests. Thinking about curriculum for the moment, reference was made this morning to Biology 30 and to Social Study courses and this is excellent. No question about it, but I am wondering whether we are not really negating our position in not having a committee, or some sort of a vehicle, to encourage the consideration of these ecological studies in lower grades for example. We talk about education kits. I agree that there is a limit on the money we can spend, but surely, as a citizen, we shouldn't have to rely on the TB Association, as I pointed out last year, for a pamphlet on this type, on the respiratory ailment diseases. These are areas in which the government can take a leading part in the educational process and they are not

expensive areas. They don't require a lot of expensive machinery, but they will provide you with dividends in that they will acclimatize people, they will make them aware of the problem, and probably better able to understand the reason why they must engage in programs, in research and buying expensive equipment and machinery.

Now I think it is very encouraging, and I hope nobody thinks I am being sarcastic, but I am very encouraged that the Education Committee has met once. The year previous they didn't meet at all and at least it is heading in the right direction, and I am well aware of the problems I am sure Mr. Martin has in that committee, but I would like to assure him of my personal support in any activity that he would like to engender in this field and I am sure that there are others in this committee as a whole who would give him their support and assistance in any type of consideration in the field of education directly or indirectly. I don't believe, sir, that there is any more important committee than the Education Committee, and that's the point I am trying to make.

MR. H. LEMBICZ

I felt that I should just add a little to what Mr. Longley has said with regards to sulphur dioxide and in one particular case I think it is hydrogen sulfide we are mostly concerned about, because I have lived alongside it along with sulphur dioxide quite a number of years and we talked yesterday about air standards and to me this is very hard to establish in regards to this type of gas, which pockets, what I mean is it does pocket according to the atmospheric conditions which prevail. Thirdly, hydrogen sulfide gases are a little heavier than air and will pocket if conditions are right. Just to paint the picture of what can happen, what did happen on my farm, I was working less than a quarter of a mile away from two battery sites that sit close together and there was a pocket of gas in at those battery sites that a man nearly lost his life. If he hadn't remembered in an argument one day I told him that that damn stuff will kill you, if he hadn't remembered that he said he wouldn't have opened the door and he fell out and cut his head on the fender, but it did save his life. The thing that I'm trying to say here is I was less than a quarter of a mile away from it and I wasn't aware that there was any gas in the neighbourhood at that day.

Now I'll tell you what actually happened in the field, because I know how this started, there were flares had gone out, some leaks from the battery site or something like this, and as usual I usually holler my head off about these things and I did get the boys on the Conservation Board to come out there finally and do something and one morning they came along there and they nailed something up on the post and then came over and said we've got the problem solved. I said I'm sure glad to hear that, how did you solve it? Well, he said, we put up a little monitor up there on the post and this is going to tell you how much gas you're getting and, of course, I told him what he could do with it. This wasn't solving the problem. Now the thing that I wanted to say, and I would like to ask Mr. Dobko, why don't we put these monitors down there where the problem is, I mean the gas might be escaping down by that battery site that could possibly measure some standard of escaping gas instead of putting it up by the house. Of course I know what they're concerned about is to prove to me that I'm not getting enough gas to hurt me, but still at times, maybe for half an

hour, there will be a pocket of gas comes through and it was enough to just about put you out of business, get down your basement and you go to the trouble of whipping it out of there and I wanted to back up Mr. Longley's statement that this gas is corrosive. It certainly ruined my barbed wire fence, it ruined the telephone wires and it rusts up the machinery and it raises the duce with my paint. I have to paint twice as often as I used to. But there hasn't been very much done about it yet, and I think we should approach this thing in a different manner, we should measure it at the source where it is escaping. This is the place the monitors should go. I might say I am very happy to hear, after a lot of years of yelling my head off, that there is consideration for compensation in regard to this. I was very happy to hear that yesterday, it's well over due and this is a step in the right direction. At least we're recognizing that there is a problem there, but the solution is to stop that stuff from getting away.

MR. K. VERMEER

I have gone over your schedule here of the Advisory Committee and it is strange that there is no subcommittee on fish and wildlife. I think you would concur, Mr. Chairman, that fish and wildlife are important renewable resources. Secondly, people can become contaminated by contaminated fish and wildlife, and thirdly it may be an indicator to the health of the environment. You have all kinds of subcommittees on air pollution, water pollution and noise, and sometimes you can come to the wrong conclusion. For instance, if you find that there is no source let us say, or no trouble, in the Alberta rivers, such as the North Saskatchewan River or the Athabasca River, because you don't find higher levels than 0.1 part per billion of mercury, this does not mean that you really don't have any trouble. Recent findings on fish by the Canadian Wildlife Service, and by the Provincial Fisheries and Wildlife Service, show that the fish are over 0.5 parts per million. The same, recently we have found fish which have levels over 0.5 parts per million in the Athabasca River. Hence I think that to omit a Fish and Wildlife subcommittee from your Advisory Committee results in lopsided views.

MR. E. LAWRENCE

Down in the deep south there we get several enquiries by telephone, in person, for information and literature relating to pollution control. Some of this information we have available and I am afraid that quite often if we haven't got the information, we refer these enquiries to the Department of Health. There are a number of publications out and in the - available for distribution from the various government departments. I think it would be helpful to the subcommittees if a list of these publications could be prepared, with perhaps a very brief one sentence outline of the contents and the source. Now maybe this is being done. If it has, I would like to see these lists distributed to the subcommittees so that we can better satisfy the people who are making these enquiries and direct them to the proper source and if not I would request that such a list be prepared. I don't think it would be that much work.

PROFESSOR P. LEWIS

I would like to support Mr. Edward's comments with regard to the availability of educational information. This committee has a valuable role in terms of having an educational function and it is important that we recognize that in the future it is going to be increasingly important to have an ecologically aware population.

In this regard there have been some comments made earlier about some of the ad hoc groups that have been active in various parts of the province and with respect to sometimes what appears to be an era of hysteria. I am perfectly willing to admit that this is the case and I think largely it comes from a sudden awareness of a situation that people have not been aware existed previously.

If we can fulfill that educational function, or contribute to it, perhaps the amount of this hysteria will decrease. This perhaps would be a great benefit. Also I would like to make a plea for the members of this committee in those interactions that they have with the local ad hoc anti-pollution groups to use the powers of discrimination that they have to differentiate between the hysteria when it surfaces and the valid comments, criticisms and suggestions that the local ad hoc groups have. I think it is false to label them all as hysterical nuts running around and prophesying doom.

Appendix BGSUMMARY REPORT ON MEETING - WATER POLLUTION

I have a number of pages of notes here and I hope I can read them, I have quite a few hen tracks here, arrows back and forth as certain items came up in various programs and as various speakers or commentators spoke into the mike. I found two years ago, and the same thing has occurred to me this year, that the concept of this conference has been very good, that is bringing together people from various disciplines, various government areas and outside to exchange ideas and to perhaps lock horns a bit, so that there can be a cross fertilization and perhaps I think everybody benefiting from it.

The conduct of the discussions has been very frank and open and to me, as an outsider here, has involved many people. As far as the reporting of the various programs is concerned, staff in our area always find that conferences put an additional load on them in preparing the material for the conference. I don't know whether this is the case here, I imagine it has to be, but I assume that the outcome is well worth the additional effort. I shouldn't assume that, I feel it has been well worth the additional effort.

The programs as mentioned here appear to have the situation very well covered in that there has been a great deal of information gathered, and this type of gathering is going on. It is very important, at least we find it so and I imagine the same situation is occurring here, and this factual data has to be obtained so that the public gets, and is aware that you have, this data and that this works both ways, both from the standpoint of the organizational divisions and also from, as far as the public is concerned. As I mentioned before, my arrows are going back both ways and this sort of thing and I will try and stick to the various items that came up on the program, but there was cross reference made, so I will make these cross references as they occur. Gene Kupchanko mentioned the monitoring and, of course, this bears in with my earlier remarks that we need a great deal of this data, the question is how much can you get. We have a fairly large sanitary engineering division in the Ontario Water Resources Commission, they're up to about 125 people, that's only the one division and it's going you might say night and day gathering data on various programs and possibly because we have to use this data in the day-to-day programs that we have difficulty getting the data out - physically getting it down on paper and presenting it to the public. I was intrigued by the suggestion made that if people want to get this data, they should be prepared to pay for it, that is if it is a private person. I think this has some merit.

Gene mentioned the mercury situation where the samples gathered of mercury, of course mercury is to us really waving a red flag in front of a bull as far as Ontario is concerned, we are right in the midst of it. We've got a task force going and it's sort of pushed everything else off to one side. We've had people from Sweden working with us on this and it's a very large program and referring to a statement made I think by a chap from the Fish and Wildlife Service later this afternoon, he mentioned that we, although it hasn't shown up in the water, it may have shown up in the fish,

but our problem was, say in the Sarnia area, there were very large concentrations in about a month. Now there had to be this link established through or by consultation with the Swedish people and others that this mercury in the bottom muds can be transformed into something that is going to get into the water, be taken up by the fish and finally by humans, so I think that if there are potential or suspected sources of mercury, the bottom mud should be looked into because it is going - it is not going to stay there. There has been a great deal of emphasis on education and I would support this type of program wholeheartedly, but here again we have an economic problem I think no matter where you are, the large number of school children, it takes a great deal of paper to get the message across. I was interested in the statement made this morning by Mr. Martin on this bibliography of pollution publications. I didn't get a chance to ask him, but I was wondering whether films on pollution were included in that bibliography. We have used many films, there is an excellent film from Shell, that Shell produced, and there are many others. In this education idea, I think one of the objectives as we see it should be to get the people involved as individuals and, of course, this - once become involved themselves they will try and get everybody else involved and it works its way back up again to where something can be put into the legislation to correct the faults as have been shown. As far as in the education part of it, there is the danger, if you don't get the public involved, you're just going to educate the educated and this just gets to be a sort of vicious circle, everybody agrees with you, but you still don't get the information to the people who are going to be affected by the pollution that is going on.

In the discussion on research, I am not quite sure whether I took in the information correctly or not, but I think there was a statement that it takes money and people and equipment, but this is quite true, but I think that there is a great deal of information that can be used for research purposes that is now being collected in routine programs and I think in many cases this data can be reviewed and scrutinized closely to indicate trends, what happens when certain other effects are known, have a bearing on the way the parameter happens to go as far as concentrations. There is a problem here as far as research is concerned that here again you have to be certain of the data you are relying on, correct data, that we don't sort of compound a problem by using certain data that have been collected by inexperienced people, whose plan of approach or methodology is very far from what should be expected when the research data is being gathered. Professor Nursall this morning mentioned the need for research to come up with criteria. Of course specific to this area, I think this is a pertinent, important factor that if you are going to set criteria it has to be on the situation as you find it here. Other criteria can give you a guide, but you still have to use these criteria as they apply to your hard water or soft water area as you find them in this particular area and any other conditions that exist here. There is also the question of the spreading of sewage on land, for irrigation purposes, and there was no distinction made whether it is just the treated sewage, that is mainly water, or sludges, or whatever, but there was a comment made that there was an outbreak of typhoid due to the spreading of sewage on land and in Ontario we still have to overcome the same thing in that raw sewages are banned and it is only the digested sludges that can be spread on the land unless you can really convince the medical officer of health that there are going to be no problems existing because of the spreading on land. Gene Kupchanko mentioned the fact that you have to take the soil, the type of soil into account. Now I think you also have to take the type of waste into account. Certain wastes, like this sugar beet waste I imagine is very high in carbona-

tious matter, as one would think and could create air pollution problems. There was a question raised regarding the lime treatment of sewage for removal of phosphates and I would never be forgiven if I went home without making some mention of it, but of course this experiment that we ran at the one installation was just to see whether the addition of lime into the influent well could be used to reduce the phosphates and we found that it did work. We got as high as 92% removal of phosphates. The work that was not done in that experiment was to look into the problems with the sludge handling and not only the digestion of sludge, or whether it should be digested, but whether we could get any additional benefits from the use of the lime process. We feel that there could be a problem with sludge, sludge digestion, but also we feel that we are not necessarily convinced that it has to be digested and here again we get into the raw bit, as far as sludge is concerned, because the sludge we obtain from our lime experiments, we kept a bit in a jar, was non-odorous, the bacteria content was very low and it did not, you can gather from the fact there was no odor, it didn't break down and we think it would have made a very good material for spreading on the soil. Although we did some experiments on lime, we do not claim that lime is the only thing that can be used to remove phosphates, far from it. There are other chemicals and there are other points of application, but I think that any program that is going to go into nutrient removal should consider all of them, all the various chemicals and various types of application and use these various means on individual plants, that is each plant should have a special research program or a special testing program to find out what the best chemical and best method of applying it is.

There was a discussion this morning by, I think it was a doctor from the Canadian Medical Association, mentioned a number of resolutions. One thing I find lacking in these various resolutions and conclusions is that there does not seem to be anything (they may have done this I don't know) directed towards supplying the pollution people with the information on substances that are going to be toxic that will appear as pollution. We are still trying to determine what the level of mercury should be, whether it is .5 or 1 and I don't think the World Health Organization has stated it yet. This .5 is nothing that is creating problems, but if people don't start talking about changing it, this is going to alter quite a few situations regarding the banning of fish and there is also the talk of varying the levels according to the ingestion rate. I think this type of information should be made known if it is available, because we knew that mercury was being lost in the plant in Sarnia, it was going into the sediments, but the chain into the human uptake was not well known and then again we did not know what the effect on a human was going to be.

There is a great deal of discussion on pesticides and in pesticides I also would lump, you might say toxic materials other than pesticides, mercury is one of them and others, possibly many of us have seen an article where we are quite concerned about the DDT residues in humans and there have been some experiments run in Miami about the use of an anti-convulscent drug which appreciably reduces residues of DDT and other chlorinated hydrocarbons in humans. This is a preliminary thing right now, but it does bring a ray of hope for the removal of these particular residues. In the program of using these various pesticides, especially in the aquatic environment, we have found that it is very necessary to insist that the operators have a sound program, have laid down a sound program, know where they are going to spray, know where they don't need to spray, and then get in there at the proper time

when these particular, I am thinking of black flies and mosquitoes now, get in there at the proper time when these things are in the stage where they can be killed. We had quite a row this spring where a certain township, the operator was going to put the spray on, didn't present a good program, in fact it was practically non-existent, and they wanted us to okay the application within two or three days. Well we insist that we need more time to evaluate the program and in this case we didn't allow it and the mail sure piled up. One thing, as far as toxic materials are concerned, I haven't heard mentioned here, I don't think I've been, as Gene said, asleep, there has been no mention made of PCB, polychlorinated phenols. This is creating quite a bit of concern back in our area. These PCBs are from the literature sort of the icing on the cake as far as DDTs are concerned. In other words, the question now is arising how much DDT can be levelled at PCBs because in many cases they have the similar peaks in the chromatogram. How much problem with the propagation of certain wildlife, eagles and osprey and this type of bird, is caused by the PCBs plus DDT. In other words, is there an effect here which is the real culprit and that if the PCBs were not there would the DDTs not create the problem in propagation.

One of the speakers, I guess it was one of the chaps commenting from the central mike, mentioned the need for Federal standards. I am of two thoughts on this particular matter, I'm not just speaking for myself, but for many people in Ontario, that this possibly could be done, but it would have to be looked at, maybe these are certain levels and you can sort of vary them one way or the other as the local situation dictates. I don't see how you can have a nation-wide standard unless it is so general that the regional standards can be made to fit the situation.

I seem to have exhausted most of my comments, but there is one that perhaps is just a little wee item here. I was interested in the strip mining discussion that stated there were fish put in these holes in the coal mines. I don't know what the purpose in putting the fish in there is, but I just wonder if these fish are edible, because we had a refinery back in Ontario that used a great big glorified fish bowl in which to run refinery effluent. Now the fish looked wonderful, but I don't think I would have wanted to eat them and I was just wondering whether this is the situation as far as coal is concerned.

In the oil and gas production discussion, it appears that many of the possibilities as far as pollution is concerned have been considered and I think Mr. Grossman said this, if he hadn't said it I would have said it, that if an accident can occur, it will occur, and in our particular area, the reason I asked the question this morning is that we've got a great many lakes, great many wells drilled in Lake Erie and we've been assured time and time again that all the safety devices are in operation and nothing would happen. Up to now these wells have only been producing gas. Any that show any signs of being in an area where oil can be produced are capped off. Thankfully, nothing has happened as yet, but we have had some minor occasions. I will admit that many times an oil well or gas well will get blamed for a spill from a passing tanker, but at the same time the other states around the Great Lakes are looking with a great deal of scepticism on the practice of drilling oil or gas in large bodies of water.

As a final remark I think that we should be on the lookout, be careful about the information that is being assembled by self-styled experts. This can be very damaging as far as the public's idea of the subject matter is concerned, can be very damaging as far as the government program is concerned. It really slows down things, instead of putting out the forest fire as we see it, we're fighting brush fires at all times, so I think that, as was mentioned, this matter of education is very important, that we get the facts to the people as soon as we can, so that they know whether the people coming out in support of this or that are on the beam or away off and would also keep groups from being misled by people who have an immense amount of zeal, but very little information.

We have, I keep on referring to Ontario, I hope you will excuse me, but we have found that pollution probe were hot on our heels for awhile until we hired them to help us, and we did fund a program, there were other programs funded in Ontario, to have pollution probe people go around the province talking to the people in the outlying areas. We, of course, gave them a bit of a quick, intensive educational program prior to their going out and from the reports we have they did do a fairly creditable job. They came back with a report that gave the government the gears, but, and in turn somebody else picked up our cause, but it still means that we still have to get the information to the public, good factual information and, of course, if they get the information and believe in what we're doing, then we should get the support and once we get the support then I think that other things will be forthcoming, budget and staff and what have you.

Mr. V.E.Voege
Assistant General Manager
Ontario Water Resources Commission

Appendix BHSUMMARY REPORT ON MEETING - AIR POLLUTION

I am not going to attempt to summarize the entire meeting. Like Fred Voege, I will try and comment on some of the things I have heard here and some of the reports that I have read. Mr. Henderson's report, which came first, and his discussion of the new Environment Conservation Authority and the Department of Environmental Improvement was new to me, I didn't know about it until I got here. If I were in California I would discuss this at great length, but it would be a little presumptuous for me to come not only to another province as you call it, but to another country, and tell people how to do these things. However, this whole business of an ombudsman for, or someone to take of, the public in government is a concept which I feel has not been used nearly as much as it should be in the United States, so in this regard I really am pleased to hear of this type of an organization being set up, the authorities I understand will represent the public, talk with the public and serve as a policy guider you might say for the government. This then will allow the Department of Environmental Improvement to do their job as is laid down by the legislature.

I will not discuss or talk much about the discussion on multiple uses, but did find them very stimulating.

Now the various reports from the Health Department and the sub-committees on air for Calgary, Edmonton and the sour gas industry indicated to me that the problems here are largely recognized and are under surveillance. As an outsider, it appears to me that your real problem in the atmospheric pollution field is a preventive problem, rather than of one of rolling the atmosphere back as we have to do in Los Angeles to some previous year. In this connection, as to the way you are going towards it, I was very glad to hear that the new power plant for instance here in Edmonton, built by the city, has been built outside the city and not put down here in the valley as the first one was. This, however, is not to say there are no problems here in the atmospheric field, the field of atmospheric pollution. You have problems which I believe though are specific to the north country, to the colder climates and with regard to this I agree with Dr. Tollefson that there is some more research to be done on air pollution control, air pollution in the colder climates and air pollution control in these climates. The fact of the matter is if it isn't done here, if it isn't done in Alberta, it probably is not going to be done. There are other types of studies which should be done which are, I wouldn't call them research necessarily, should be done here as well as elsewhere, and these have to do with proper planning and proper zoning. I am somewhat like Dr. Ball, I have always been a little disappointed in the planners and zoners in that they seem to do a pretty good job of keeping the industry out of the residential areas, but comes a time when somebody wants to build a residential development near an existing industry, why a variance is usually given and it goes ahead and creates a new problem. I would like to see the planners look forward to this thing a little bit better.

I was very much interested in the program, Dr. May's program on noise and here again a forward looking program. The excellent talk that was

given by Dr. Rose this morning on aircraft noise of course just scratches the surface of this problem. Now there was considerable discussion yesterday on the problem of air pollution criteria and I would like to digress for just a few moments and mention, go in a little bit to a few of the things I felt I didn't have time to do at that time, but just mention them briefly, because I believe the biggest problem that we see, that we face, in the air pollution field, is this business of the relationship of air quality criteria to air quality standards. The relationship of these to the regulations which we are going to adopt, because actually when you get right down to it, air quality standards never solved any air pollution problem. The only way you solve them is by an actual regulation and that generally is a regulation on the emissions coming from a plant.

You might be interested very briefly in the theory of the ambient air quality standards as exercised in the United States. Here the Federal Government divided the United States into eight atmospheric regions, atmospheric areas, and they further developed the country, not into states, for air pollution purposes, but into regional areas, some states have several regional areas, usually built around urban communities, others have intra-states and there are still others where the entire state is one region, but whereas we have 50 states I think there are now something like 83 regions and they figure this will reach something over 100.

The next thing is done the Federal Government publishes air pollution air quality criteria, which I mentioned yesterday is just a statement of the relationships of different dosages of pollutants, we say time, concentration, to some effect on people. Then these regions or states will go ahead and develop ambient air quality standards, based on these criteria. This is sent back to Washington, they have to approve them, if they approve them then the regional organization first must make an emission inventory in their particular region, they must develop a meteorological model so that by means of the emission inventory, the meteorological model, the measurements they have done in the atmosphere figure out what kind of an emission reductions must be accomplished in order to reach the ambient air quality standard. They have to send this in also to Washington, this is called the implementation plan, but more or less it is just what particular regulations do we have to meet this thing and these are then emission standards.

Now actually these standards should be reasonably attainable in my idea, but this has not always been true. The whole situation is in a sort of state of flux, but generally I feel, and these are my own feelings, that standards should be based on sound criteria and that the basis of these standards should be stated. I believe that in the standard - ambient quality standard - one should state the method of analysis which is to be used so that everybody will know what we are talking about or at least it should be referred to. Background concentrations have to be taken into consideration, otherwise the emission standard, you get down below the - man's part that people put in there and start trying to take a crack at what nature puts in there and you get into a real problem. Standards probably should be subject to change. We've gone through this business in California of setting a bunch of standards and then also setting long-range goals which makes sense generally speaking, but the public gets quite confused. They look at the lowest

number and they say why can't we get our long-range goals now. We don't have an environment conservation authority to answer these problems and I am sure those questions will come up here. When you have more than one set of numbers, the public really gets confused in this situation. This whole business of setting regulations is a complicated process. I might just mention in passing that the Federal Government has taken over a great deal of it in the United States and I would say that the majority of us in California, that is the anti-pollution groups and all the rest of us believe that this has delayed and confused our programs, it's diluted the program in California to a certain extent. Now I don't know how you in Alberta might feel about Federal ones in Canada, but I am just stating some of the problems that we have obtained, particularly in the Los Angeles area and generally in California.

I was very much interested in Dr. Smith's talk this morning, his progress report on the epidemiological study that is going on in the University of Alberta to try to relate suspended particulate matter levels to certain health effects. I am glad to see this being done in Alberta, not only for the sake of Alberta, but for the sake of science, because when we were going ahead and trying to adopt air quality standards for particulate matter in California, we found out that the only data there is, is data that was obtained in Buffalo and New York and Tokyo and London and the coal-burning communities of the east, Europe and Asia where at first there was a much higher sulphur dioxide content than we have and secondly where most of the particulate matter is soot and trying to regulate that to a low SO₂ regime as we have in California and a non-soot particulate matter was just impossible, although unfortunately why we did adopt a standard based on those, but I don't think it makes sense, and so I would be glad to see what comes out of the study here. I hope Dr. Smith will not be surprised if he comes up with negative results, but I hope if he does come up with negative results, he will publish them, because that is one of the difficulties, we don't find out the things that don't work and this is sometimes even as important as the things that do work.

There was one statement made by Mr. Grossman this morning when he spoke on the Zama Lake oil development, he praised one of the authorities here for making their requirements known early enough so that the companies could incorporate them in their plans. This is one of the things we have to do in all fields of environmental planning, because this is the thing that causes more trouble than anything else. The big fracas that we've got on in the United States at the present time with the automobile manufacturers is this neglect of early planning and changing the rules before the rule #3 - three times back - has gone into effect and this keeps, this is one of the things that keeps the industry I believe from doing a respectable job.

I was interested in Dr. McIntosh's statement this morning. It was certainly a very hard-hitting presentation. It is on the report of the Alberta Medical Association's committee on public health. I haven't actually seen the report, so it really would be unfair for me to comment on it, and particularly since the recommendations were, I suppose you would say, largely political. I did shudder personally at this thought of being assumed guilty and having to prove my innocence, and I was a little bit surprised to see it coming from a medical association because I am sure that no physician would want to be presumed guilty of malpractice when his patient died, but there are things on both sides. He mentioned also something about Federal standards,

because he felt that these standards would be uniform and that this would, in other words, allow competition. We've looked into this quite carefully and we do find there are no two plants exactly alike and have the same economic situation. Now if everything else were equal, then uniform regulations would be the proper thing, but some people are closer to the market, some are closer to the raw material, this that and the other, and the standards I think should take a lot of things into consideration.

I would like to comment for just a moment on Mr. Cameron's speech or short talk this afternoon on the dual fuel vehicle as in natural gas, a gasoline vehicle and the fuel tax situation. This particular thing has been developed in California by the Southern California Gas Co. and the Southern Counties Gas Co. as far as natural gas. It is rather interesting that when they developed this and put it on their own fleet of cars, they made a deal with the government to pay an in lieu tax in place of the gasoline tax, so there wouldn't be any arguments until such time as the state legislature could do something about it. However, I kind of believe that this business of use of natural gas is only going to be applicable to fleets. You could certainly change your car over to it with a kit for about \$300.00, almost any car, but you run into so many problems, safety hazards, and things of that sort, that unless you are pretty well removed from the normal stream of events, it would be hard to service these with natural gas. We ran across this several years ago in the case of L.P.G., liquified propane gases, petroleum gases, do an excellent job and we have operated buses in Chicago, we have operated buses in central Los Angeles area, they don't make a great deal of pollution and there are some economic reasons for using these things, but if we ever had to go to having the public do this, you just would have to remove all the filling stations and put them out some place else, because as one operator told me, you'd be surprised the number of times someone does drive away from a tank with the hose still in his gasoline tank and tears the tank out. Well a situation like this in a gas situation would be a little difficult, although I would assume it could be handled. There is no doubt about it, dual fuel vehicle has a place, but I feel it is with fleets.

I was also interested in the movie showing air pollution over Calgary. I think there is no doubt about it, it shows that there is an incipient photochemical smog problem in Calgary, although I couldn't help but think while they were showing these pictures, if we were showing them down home we would say it's a beautiful day in Los Angeles, I mean even when we had this black stuff around there. I believe what the thing does to me, it warrants at least from a scientific standpoint some more research on photochemical smog at low temperatures. All the work that has been done, that I am familiar with, has been done at temperatures of 80 to 100°F. and higher, mainly because it costs too much to refrigerate the smog chambers. So I think that some work could well be done here, that would apply to the situation here in Alberta. I believe also, however, that the pictures themselves aren't the whole thing, because I am certain that in those pictures showing this pollution cloud over Calgary, that there would be some dust from cars, just traffic dust and just dust in the morning people are going to work, they're moving around so there would have to be some atmospheric analysis done at the same time.

In summary, I just want to say that it has been apparent to me in the several years I have been coming up here, meeting with this committee,

that you have done an excellent job in educating each other. I find that the people who take part in the discussions are much more learned in environmental problems than they were at the time that you started out and I believe that with the new Environmental Conservation Authority, I am sure that this educational program is going to be accelerated.

I am delighted to have been here and I hope that I have made a useful contribution to your deliberations. Thank you.

Dr. W. L. Faith
Air Pollution Consultant
San Marino, California

Appendix BISUMMARY REPORT - CHAIRMAN, ENVIRONMENT CONSERVATION AUTHORITY

I am very pleased to be able to stand up and be with you here now at the end of these, to me, most interesting and complex and very able meetings and discussions. I have a feeling of forward motion as the simplest single feeling coming out of my attendance here and my observations of proceedings. And as you will know so much of what is happening to me these days are learning experiences for me and so part of my reaction is to develop or get an understanding perspective to sort of streamline my ignorance into, I hope, a stage of increasing intelligence.

The sense of forward motion that I have is partly out of the series of events over the years that have developed in our province in respect of matters pertaining to the environment and to pollution and certainly this began with the very good work that was done in the Department of Health, followed by, it seems to me, the inspired notion that the Advisory Committee that is meeting here today should be established and then out of that what I hope will turn out to have also been a good idea that the Environment Conservation Act and the Environment Conservation Authority should take actions and now ahead of us the development of the new Department of Environmental Improvement.

Now out of these motions that still continue, out of the past into the present and through to the future, we have, it seems to me, something going for us that shows a kind of high quality environmental thinking in our province that I am delighted to be a part of and I wish to commend to all of us.

The kind of situation that we have in our province presents us with a characteristic pattern in an environmental sense that is something that is ours alone and that distinguishes us from other provinces and regions and countries, even though we participate in the environmental problems of other places. Our low density of population, our high concentration on basic resource developments, the very considerable percent utilization of our land surfaces as compared with the lake and stone countries that are common in other parts of Canada, the relative undevelopment of heavy and light industry and I think the modest, though real, urban problems that our cities present us, give us a set of environmental factors that both give us opportunities and that give us the kinds of problems that as we move into the future we must handle.

Now in the Environment Conservation Authority, the responsibilities that have been indicated by the Act passed last spring include attention to resource management, to conservation and to pollution control. These matters are, of course, in many ways interrelated, but also they have sufficient distinction so that they can be partly looked at in their own right. The nature of these problems clearly is that they possess a very broad coverage on the one hand and on the other require a person probing in these areas to go to very great depth in different sectors of this broad area of interest. Now the Environment Conservation Authority has a certain kind of function to perform in these areas, along with other agencies, departments and groups.

The kind of role that the authority is to perform must be done, I believe, working always closely with the full structure of the public bodies as well as with the full structure of the departments of government and then by advice and recommendation with the executive council and this, of course, is precisely what the Act describes for the authority. I am not too sure how and in what ways, and what steps, the authority will take to assist in partly unravelling and as time passes moving into the future that we hope will be attainable for the citizens of our province, but I do know it can only be done through the co-operation and through the expertise of those people who are citizens with us.

Now from this point of view I have found most instructive the manner and the way in which this committee has worked. I think it has important strengths that are of genuine help in moving forward into the future in this area that is of interest and concern to us. I would like to mention a few of these that I think are important strengths in the committee. The first of these is the direct contact the committee has with ministers of cabinet. I think the requirement that considerations, that have an impact on policy, are made known and are discussed with cabinet ministers is an important one. I think the excitement and the feeling of significance that is gained by the presence and participation of the senior policy determiners in the province is also of first-rate importance.

Secondly, I think the co-participation of civil servants including senior civil servants with representatives from the public area, from the universities and from industry makes that kind of meaningful exchange that is directly basic to the formulation of policy and of policy considerations and the understanding of each other's positions that is needed as we move forward in our province.

Thirdly, and this again is because the problems that we deal with cover broad areas, but must be looked at in depth by highly expert people and still have attention given by people with broader interests, the subcommittee structure that the committee has established which enables that kind of detailed and deep consideration to be given to specific subjects, and to enable thoughtful discussion to go forward, it seems to me of great importance. And finally the bringing together of these specific recommendations in a large body composed of people who know a great deal about the specific recommendation and of others who know much less, but may know something that is highly relevant and highly germane to the particular recommendation, seems to me also to be an important strength in this endeavour as I see it that is being made in the province, to move forward into the questions of the environment on a broad participatory front. I have partly the feeling that the kinds of problems and the kind of predicament that man in the world is now confronted with is an epic making time in the sense that we now systematically over the world for the first time as a species appreciate that we must think of what is going to happen as a result of an action we take now, rather than merely take that action, for we recognize, and I think generally accept, that the after effects of actions may help to determine or change the terms of reference in which life is lived and I think that as we now attempt to be intelligent with this new attitude it may be that in the world as a whole we are passing into a time

of change, like the industrial revolution, like the stone age and like other named changes. In this respect, I carry from these meetings a feeling of hard optimism, I have been definitely impressed with the competence and the confidence with which individuals have attacked their problems, reported on them and worked together towards common ends.

The feeling I have of a forward motion, which we will now take with us into the future, and of which I suspect many of us here will be talking together many times as the days pass is a good feeling to have and it is a good province to have that feeling in.

Dr. Walter Trost, Chairman
Environment Conservation Authority

Appendix BJCONCLUDING REMARKS BYTHE MINISTER OF HEALTH

Thank you. Possibly the first thing I had better do is to mend my fences over the word 'schizophrenic', which I used yesterday morning. This is no doubt one of the hazards of speaking off-the-cuff.

I believe the remarks made by Mr. Edwards are particularly pertinent to these proceedings. We are not protagonists or antagonists in this particular exercise. I fully appreciate the strong convictions held on various aspects of this question. The main thing that brings us together is a basic desire for improvement. I assure you that if there were any question of being protagonists or antagonists I would not have suggested to Harvey Hogge that we invite representatives from various anti-pollution groups to attend this conference.

I think the discussion and the expressions of opinion reflect quite logically a matter of different perspectives. There is the expert who views things from his particular field of expertise, the citizen whose basic concern is, as Mr. Lembicz stated, "the filthy habits of mankind", and there are the government officials who must balance the differing pressures. If my use of the word 'schizophrenic' was grounds for concern - and this is probably one of the pitfalls of a layman being a Health Minister - let me assure you that it was not offered other than to illustrate that on the one hand we are all after the ideal and on the other hand we must rationalize the ideal with the practicalities, which ultimately results in an internal conflict, which I am certain each of us experiences.

Listening to the discussion - particularly the early parts of it yesterday - I became most concerned about the way speakers were using the words 'criteria' and 'standards'. These words are primarily used by the technical experts. I do not speak as a technical expert, but I would have to suggest that it is unrealistic to assume that action in developing future programs in the field of pollution control is simply going to be based on a technical interpretation of 'criteria' and 'standards'.

There are many other factors which must be considered when it comes to rationalizing the complex problems and issues confronting us. There is the question of public policy in a democratic system - public policy based on public attitudes. A policy was adopted by the government last year, making it mandatory that every community in the province discharging sewage into a stream must have at least primary treatment. On the basis of criteria and standards, one would find it difficult to logically justify the necessity of forcing Athabasca, Jasper, Banff, or some other small community to install primary sewage treatment. This is the result of the fact that given the flow of the Athabasca River and the sewage the town of Athabasca is putting into the river, the amount is extremely insignificant. One cannot justify this action simply on the basis of criteria and standards.

Also, it is impossible to decide where industry should or should not locate on the basis of criteria and standards only. While some would dress it up in a cloak of scientific knowledge, much of the issue of criteria is arbitrary. As our scientific knowledge increases and improves, criteria

will become more meaningful. Regardless of 'criteria' and 'standards', as a government we would be extremely reluctant and most likely would not approve the development of a pulp mill located on the North Saskatchewan River 20 miles upstream of Edmonton. For the same reason, the Edmonton petrochemical complex is downstream of the city. To illustrate further, as far back as 1948 C.I.L. bought a quarter section out in Devon with the idea of building a petrochemical plant. They hoped to build the plant at Devon as they had the option on the gas from the Leduc oilfield. As a taxpayer in Devon, I had been disappointed that this never came to fruition, but as the Minister of Health I am pleased that it was through basic common sense and not standards that C.I.L. was made to throw away several thousands of dollars and build their plant downstream of Edmonton.

There has been some concern over the varied application of standards. We make no apologies that through the Oil & Gas Conservation Board we expect industry to maintain and meet far tougher and tighter standards of control on sour gas plant operations in the vicinity of Calgary than we do in the non-populated areas of the province. Indeed, complete enforcement of air, water and land pollution standards for oil and gas has been vested in the Oil & Gas Conservation Board, to give notice to the industry that the alternative to meeting our standards is closure of their operations.

As the technology in industry improves, the standards, criteria and regulations are going to change. They will become more stringent. Industry certainly recognizes this fact. I would reiterate the government position that industry has only certain privileges and does not have rights. In the public interest, the government reserves the right to retroactively change the standards and criteria at any time it is demonstrated that the technology is capable of achieving higher standards. A complaint often advanced on behalf of the industry is that they must remain in a competitive position. However, in the final analysis it is the consumer who pays for these pollution control measures.

Any pollution control program must take basic social attitudes into account. I listened carefully to the discussion on air pollution and the need for research. More significantly, I would rather suspect that in terms of public health we would do more good if we banned cigarettes and tobacco completely. It would do a great deal to improve the health of the average citizen. Indeed, the elimination of automobile pollution must take a back seat to the limiting or eliminating of individual smoking habits. Realistically we must be guided by social attitudes. Again, this brings up the contradictory attitudes which come into play and must be taken into account when rationalizing decisions - rationalizing the tremendous complexity of problems and issues.

We must also be aware that absolute judgements regarding the complete elimination of pollution are unrealistic. It is theoretically possible, but the social consequences do not require further elaboration. In the past two days we have discussed the issue of coal mining. To my mind the only question is whether we should or should not mine the coal. This is the subject of the public debate. Regardless of whether you mine coal on mountain sides or on the flat land, there are going to be environmental consequences. One must weigh the social benefits with the ecological changes. Sooner or later the issue must be resolved on this basis. If the decision is made to mine, then, and then only, does the debate centre on reclamation standards and criteria.

Similarly, it is apparent that it is impossible to have an oil industry without expecting some environmental consequences. One of the simplistic ideas put to me consists of the opinion that one can prevent damage to the environment as a result of industrial accidents by passing a regulation. Some individuals would have us believe that by passing a law we would automatically prevent another Athabasca pipeline failure. By way of comparison, the Apollo 13 program, which was an ultimate engineering effort in terms of design - with a zero defect system - aborted over a \$15.00 or \$20.00 switch. The fact is that we must accept the environmental consequences of industrial accidents if we are to enjoy the benefits of industrial productivity. The chief objective of governmental programs must be to minimize such occurrences by preventative measures.

This leads into another aspect of the issue that I would like to raise. Pollution programs must necessarily have a major educative component. We agree with this, but on the other hand it does have some problems associated with it. I would like to comment briefly on some of these problems.

The Environmental Health Division of the Department of Health simply does not have the staff to meet the tremendous number of requests for private information on the subject of pollution which we have received in the last year. The nature of the requests requires the attention of our technical people. We have devoted a substantial amount of professional time to this exercise, while at the same instant receiving complaints about our staff's inability to come to grips with real problems. This places our staff in a most difficult position.

For example, as Bill Yurko knows, this process is extremely time-consuming and expensive. At the last session of the Legislature, Bill made a sincere request for certain information which the Legislature ordered returned. It appeared innocuous when the Legislature approved it, and we, as a government, had no objection to it in principle. However, when it came to actually digging out the records ordered by the Legislature, the price tag on printing alone was going to run close to \$15,000.00. This fact seems beyond belief, but it is true. As a result of a discussion in the Legislature, the order was changed and I believe the essence of the information was obtained at a cost of approximately \$200.00. I hope you can appreciate through this example that when some requests are submitted we simply do not have the staff capabilities or the funds to meet them.

However, there is a great deal of information available on the field of pollution, much of which has to do with personal health. As society increases in complexity and as knowledge expands, the volumes of information readily available from government offices will also continue to increase. Indeed, at present many routine publications and pamphlets can be obtained quickly at little or no direct cost. There is, however, an inherent problem we must all recognize - a problem which came to the fore in the federal government's decision to establish 'Information Canada'. That is, that in a democratic system the use of public funds to disseminate information quickly leads to the charge of misusing public funds for partisan political purposes, and as a result is difficult to rationalize.

Having said this, we are certainly aware that the new department must have an increased capability for providing public information. We must, however, be aware that in order to separate out frivolous requests for

specific data, some system of charging for the time and duplication of information must be instituted. If we do not do this, the cost will become prohibitive. This will be separate from routine information that will be required increasingly and which will be generated and in turn readily available. Indeed, we hope to have some form of central data bank for information in the new department and this no doubt will assist in solving much of the problem.

Another aspect of the issue of pollution control is the dilemma over the issuance of bans. Notwithstanding that, I have suggested that pollution must always be viewed as a relative problem. There is the occasion when outright prohibition must be exercised. I am especially concerned about the use of chemicals as pesticides. The consequences of using a compound such as mercury are empirically proven, but more information is required on the national level.

One other item I would like to briefly touch upon is automobile pollution. While there may be some disagreement, I would venture to say that the bulk of the air pollution in Edmonton and Calgary comes from the private automobile. It is the intention of the government of Alberta to complement the federal regulations coming into effect in 1972, which will require the installation of exhaust emission devices on automobiles manufactured and sold in Canada. We will complement these federal manufacturing and sales requirements with provincial regulations regarding maintenance of this equipment. I am convinced that when this happens the question of the individual consumer being at the root of the pollution problem will become very real. It will be most interesting to witness public reaction. We are hopeful that the reaction will not be similar to that encountered with the motor vehicle testing program. The maintenance of exhaust pollution control devices will be an individual responsibility and failure to comply will result in legal prosecution. Requirements to maintain exhaust control devices will be further complicated by the issuance of uniform enforcement. Will we require the individual residing 50 miles north of Peace River to maintain such a device in the same manner as the citizen of Edmonton or Calgary? I am convinced that this process will determine just how concerned the individual citizen is about pollution control, when it hits him squarely in the pocketbook!

I would like to touch again on the subject I raised in my opening remarks - that of the future of these committees. Some general ideas were reached last night at the meeting of the chairmen and secretaries. These are by no means final; however, I would like to present them to you, realizing that it will be difficult to discuss them at length and arrive at a definite decision. Initially, it was concluded that the committee structure should be overhauled. In addition, it was found that there was need for an air quality committee which would also focus attention on the elements of research required. The need for a water quality committee must also be assessed, as well as a committee on land use and reclamation.

On the subject of land reclamation, I might just review the item raised as to the differences in appearance of old coal mines in the province. The differences in reclamation can be attributed to the fact that the regulations were passed in 1963. Prior to that date it presents an extremely difficult legal problem. The Alberta government is most concerned and we are examining the steps to be taken and are determining how payment will be made.

It was also felt last night that there should continue to be a single committee concerned with the problem of pollution in the oil and gas industry. The main rationalization for this step is that this industry is such a large and significant development in the province. In addition, we must have some group looking at pesticides and other related chemicals. This area must be under constant scrutiny.

There has been a feeling expressed that as an alternative to a Calgary water and air quality committee, we have a regional Calgary committee reviewing the broader issue of air, water and land pollution. This suggestion has been taken. We will also review carefully the idea of a group looking at fish and wildlife. As you will appreciate, these committees have evolved as advisory bodies to the Minister of Health. With the review of fish and wildlife, I must admit we would be crossing into another Minister's realm of authority - that of Lands & Forests. I would like to hold this suggestion in abeyance until the new department is established and after that I am certain a resolution will become more evident.

This also leads to the recommendation made earlier as to who the Advisory Committee should relate to in the future. This was discussed last night at some length and the general consensus reached was that the real future of the Advisory Committee lies with the Environment Conservation Authority. It was agreed that there were a number of logical reasons for this move. At the inception of the Advisory Committee, pollution was much less the popular political subject. When a subject becomes the topic for political debate, it also becomes increasingly difficult for the Chairman - if he is a Minister - to maintain a position of accountability to the members of the committee. At times it is difficult for me to resist the temptation to compete for time at the microphone. The role of an impartial chairman poses a very real problem when you attempt to defend a position. If the committee is responsible to the Environmental Conservation Authority, there would be a better opportunity for full and open participation of the Minister - the Minister who would most likely have the responsibility for the new department.

Another reason advanced for assigning the Advisory Committee to the Authority is the fact that the Authority is responsible to the entire government - to all members of the Executive Council. Thus, recommendations made through the Authority will have a greater impact than if they were reported to one Minister. In addition, the Authority is required by statute to table an annual report of its recommendations to the Legislature. This gives the Authority a form in which to publicly outline its position. I must admit that I have to wear a number of hats when speaking in the Legislature and in the public eye there may therefore be some confusion over the concerns advanced by the Advisory Committee.

Also, if the committees are to continue to serve a meaningful role, we should re-structure them in such a manner that the terms of reference are clear. It is my intention to hand this problem, as well as that of re-structuring the Advisory Committee, to Dr. Trost. He will shortly be in touch with the committee chairmen to discuss this view.

In closing, I would like to illustrate one very positive aspect of pollution. This relates back to the relative nature of the problem. When I got up this morning the temperature was 22° below. As many of you know, I

live in Devon and I could hear by the radio that it was only 8 below in Edmonton. Those lucky people in Edmonton - enjoying the benefits of all the thermal pollution! However, it still does not encourage me to move into Edmonton.

I have personally found the discussions and exchange of views most informative. I certainly thank each one of you for coming. The exercise of the past two days points out that in the final analysis and regardless of different perspectives, we show the same goals.

Again, my sincere thanks for your time, effort and consideration in your attendance at this Annual Conference.

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